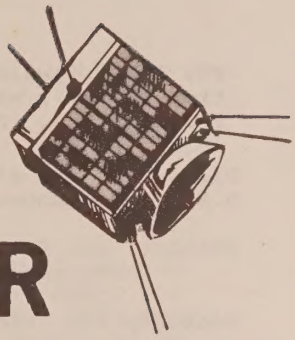
AMSAT™ NEWSLETTER



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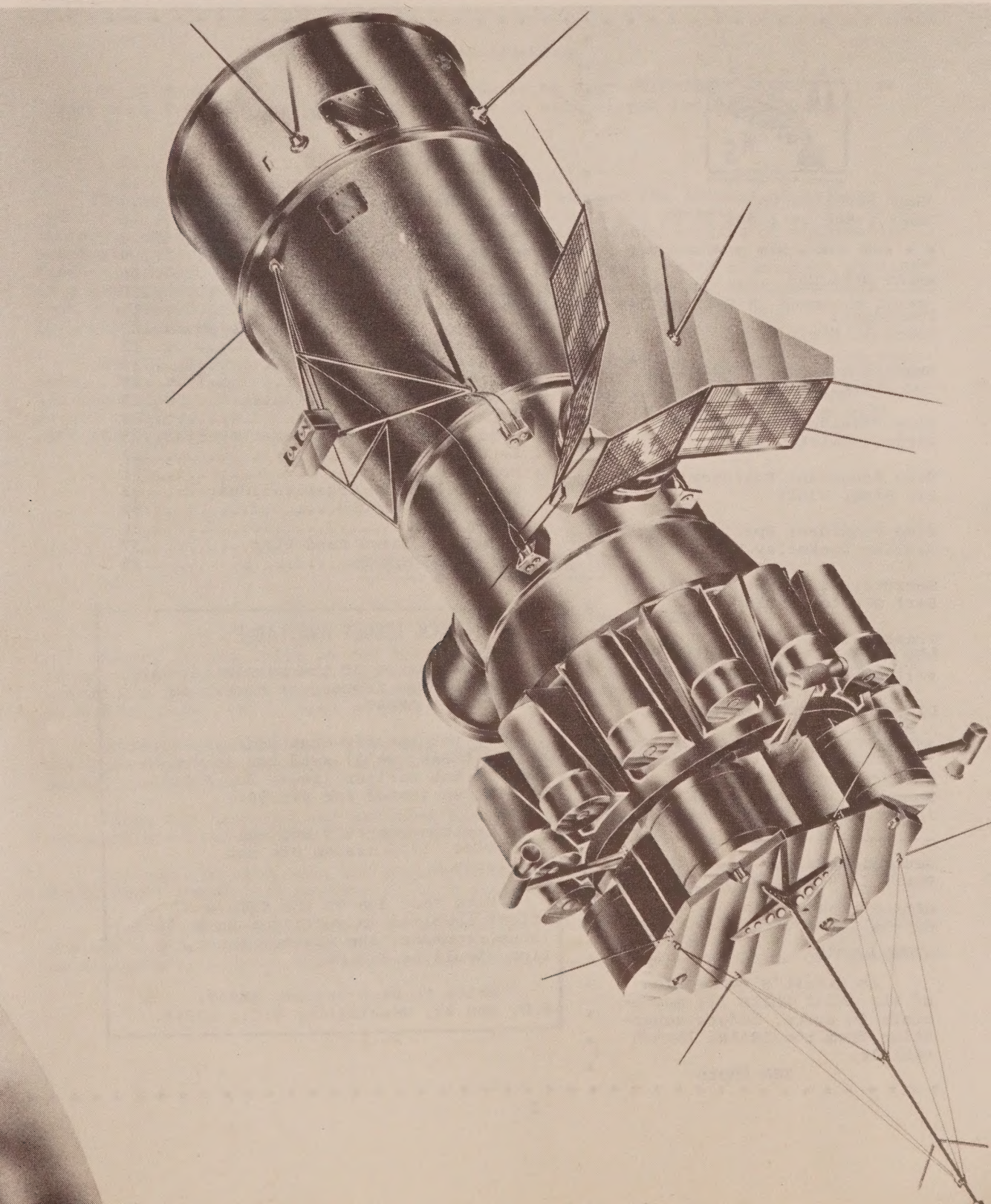
Issued quarterly by the Radio Amateur Satellite Corporation

Vol. XI Number 1 March 1979 $1.00



The AMSAT Newsletter is published quarterly by the Radio Amateur Satellite Corporation (AMSAT), with offices at 700 Seventh Street, S.W., Suite 224, Washington, D.C. 20024, U.S.A. Printed in the U.S.A. Second Class postage paid at Washington, D.C. (USPS 041-850)

Please address all correspondence to AMSAT, P. O. Box 27, Washington, D.C., 20044, U.S.A. Telephone: (202) 488-8649.

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Subscription Price: $6.00 per year, inseparable from $10.00 membership dues.

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MEMBER ARNS Amateur Radio News Service

Copy Deadline for next issue is 1 May 1979

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COVER PICTURE

An artist's conception of the AMSAT Phase III spacecraft in space, before separation from the ARIANE launch vehicle.

ESA Photo

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BACK ISSUES AVAILABLE

Back issues of the Newsletter are available upon request in return for a donation to AMSAT.

If you specify what year you first joined AMSAT, we'll send you an assortment of ten earlier issues for $10.00, or fifteen issues for $15.00.

Certain pre-1974 and the September 1975 issues are not available.

Note that due to the time and effort involved in servicing back issue requests, the minimum donation should be $10.00.

Write to Back Issues, AMSAT, P.O. Box 27, Washington, D.C., 20044.

EDITORIAL

By Joe Kasser, G3ZCZ

Somebody

"Why doesn't somebody....." is a common complaint these days. Well, who is somebody? There are only so many hours in the day and so many people doing the work. If somebody volunteered then more things could be done. AMSAT, like many organisations is managed mostly by volunteers. The volunteers are motivated in different ways, and many studies have been done on "motivation of personnel in organisations". If the goals of a volunteer and the goals of the organisation are in harmony, the volunteer will do a good job. Thus, if you can see a need for somebody to do something and it is something you wish to do -- why not do it? That's how the rest of us started.

Area Coordinators

To those of you who answered the note in my last editorial-- thanks. I am sorry that I do not have the time to reply to each of you individually.

The ARNS

The Amateur Radio News Service (ARNS) is organised for editors of amateur radio club publications. It is not a news service in the sense of UPI, Tass or Reuters, but is an organisation with aims that include the sharing of information concerning common problems between club editors. Such information includes the finding and encouragement of authors. If you belong to a radio club which publishes a newsletter or bulletin, you ought to consider recommending that your club join that organisation. (write to: Doris Dennstaedt, WA3HEN, 303 N. Hammonds Ferry Rd., Linthicum Heights, Md., 21090.)

One of the activities of the ARNS is an annual competition between club journals. This allows the editors to see how their journal compares to others in similar categories. I am proud to announce that the AMSAT Newsletter has placed first in its class in two consecutive years (1977 and 1978). With your help, we will make that three years in a row, ...four...?

COMPUTER PROJECT UPDATE

By Joe Kasser, G3ZCZ

Please do not write in for more information. The only information that exists is or has been published in the Newsletters. We do have an up-to-date group purchase plan sheet that contains prices and announcements. If you send in an sase, attention W3IWI, we'll send it to you.

The ARC-1 RTTY Card artwork has been completed. Prototypes should be made by the time that this issue is mailed out. The June Newsletter should carry further details (I hope).

Phase III hardware and software have been prototyped and are being tested. An announcement will be made in the June Newsletter as to their availability.

The new CPU card from SSM contains much of the circuitry needed for a dedicated front panel-less system. Fliers are available for the usual sase.

BYTE Magazine has carried an article about the communications uses of computers and amateur satellites (Nov. 1978) and an introduction to IPS (Jan. 1979). An expanded article on the AMSAT-GOLEM-80 will be carried sometime in the future.

FROM THE PRESIDENT'S DESK

By Perry Klein, W3PK

AMSAT's FIRST TEN YEARS

March 3 marked the tenth anniversary of AMSAT's formal organization; the incorporation papers that registered AMSAT as a non-profit, non-stock corporation in the District of Columbia were filed on March 3, 1969.

The idea to form AMSAT was suggested on January 9, 1969, at a meeting of the Communications Satellite Corporation Radio Club in an address by George Jacobs, W3ASK who suggested the need for a new group to carry on the work of the California-based Project OSCAR organization. The idea was discussed with representatives of the radio clubs of the Johns Hopkins Applied Physics Laboratory, IBM Federal Systems Division, Aeronautical Radio, Computer Sciences Corp., NASA Goddard Space Flight Center and Communications Satellite Corp., and it was immediately evident that there was much interest in creating the AMSAT organization. Many of those interested in helping were already involved professionally in satellite-related programs and had the technical know-how to design, build and test satellite systems.

By the end of 1969, membership in the new AMSAT organization stood at 250, a number small enough that the AMSAT Newsletter could be assembled and mailed by hand. Now, at the beginning of 1979, we have more than 4,300 members in 75 countries, including over 1,000 life members, and membership records will soon be maintained by AMSAT's AMS-80 microcomputer system. During the same period, annual expenses grew from $811 in 1969 to $98,086 in 1978. The cumulative total spent by AMSAT for amateur satellites and membership services over these ten years has been $345,841, yet over half that amount is expected to be expended during 1979 alone.

Several milestones were achieved in the first ten years of AMSAT's existence:

- Australis-OSCAR 5, built by students at Melbourne University in Australia was launched by NASA January 23, 1970 and operated for 52 days. AMSAT was responsible for testing and preparing the satellite for launch, and for arranging the launch by NASA and licensing by the U.S. Federal Communications Commission. This was the first OSCAR satellite to transmit on ten meters and to be actively controlled by amateur telecommand stations.

- AMSAT-OSCAR 6, first of AMSAT's long lifetime "Phase II" series spacecraft was launched by NASA on October 15, 1972 and operated until June 1977, a period of 4½ years, far exceeding its original one year lifetime expectation. AMSAT was responsible for spacecraft design, fabrication, testing, launch arrangements, licensing and operation. AMSAT-OSCAR 6 was used for several unique experiments, such as tests to determine the positions of emergency locator transmissions from simulated downed aircraft. It was also used in many schools as a resource for classroom demonstrations and experiments.

- AMSAT-OSCAR 7, second in AMSAT's Phase II series, was launched by NASA on November 15, 1974 and is still in operation, though showing signs of wear and tear, and difficulties in telemetry and telecommand. AMSAT-OSCAR 7 represented the result of a team effort by Project Australis, AMSAT-Canada, AMSAT-Deutschland and AMSAT U.S. members under AMSAT's management. OSCAR 7's capability, sophistication and anticipated lifetime are comparable to the first six OSCAR satellites combined.

- AMSAT-OSCAR 8, developed as a replacement for AMSAT-OSCAR 6, was launched by NASA on March 5, 1978. This spacecraft contains, in addition to a two-to-ten meter transponder identical to the ones flown in OSCAR's 6 and 7, a new two-meter-to-70 cm transponder developed by members of the Japan AMSAT Association. Construction costs of OSCAR 8 were reimbursed by ARRL, who has operations responsibility for this spacecraft.

- AMSAT-Phase III-A, first of a series of long-life satellites intended for high-altitude elliptical orbit, is now under development by AMSAT Deutschland and AMSAT for launch on the European Space Agency's new ARIANE launch vehicle early next year. AMSAT Phase III spacecraft offer the significant communications advantage over the previous low-orbiting OSCAR's of providing improved coverage for hours at a time over transcontinental distances. This is expected to provide a new communications resource for emergency communications applications and make possible experiments not feasible with satellites in lower orbits.

- Our AMSAT-OSCAR Spacecraft Laboratory was completed in October 1978 at the NASA Goddard Space Flight Center Visitor Center in Greenbelt, Maryland. Used as a center for Phase III spacecraft work, AMSAT computer operations and flight hardware storage, the facility was provided by NASA under a no-cost contract with AMSAT.

- AMSAT's Washington office, recently expanded, is located in a condominium complex in Southwest Washington near the Capitol building. Much of the membership records, supplies and files are maintained here.

- AMSAT's professional technical staff now include a full-time Phase III Project Engineer and a Phase III Project Technician in addition to teams of volunteers in the U.S., Germany and elsewhere. In addition, AMSAT has a professional Office Manager and General Manager, supported by some 130 volunteers listed in the "AMSAT Directory", including area coordinators, overseas coordinators, telecommand station operators and heads of AMSAT affiliate organizations.

- AMSAT affiliate organizations now include WIA Project Australis, AMSAT-Canada, AMSAT-Deutschland, AMSAT-France, AMSAT-Italiana, Japan AMSAT Association (JAMSAT), AMSAT-Mexico, AMSAT-Nederland and AMSAT-UK.

Projections of AMSAT's Future

It is, of course, hard to predict what the future will bring, but here are some of the President's predictions for the next ten years based on current trends and knowledge of projects now underway.

A) Membership ten years from now may achieve 20,000 including as many as 5,000 life members (assuming a 16½% geometric growth pattern, or a linear increase in membership of 1,600 per year).

B) AMSAT Phase III satellites will be in regular production, with launches averaging every two years. Orbits are likely to be fully geostationary, as well as drifting synchronous and high-altitude elliptical.

C) Long lifetime SYNCART (Synchronous Amateur Radio Transponder) packages will be developed for launch as part of commercial or government payloads, and several of these systems will be in orbit in the 1980's.

D) Lower orbiting Phase II satellites will be built by active amateur groups outside the United States, including the United Kingdom, perhaps Italy and Japan, in addition to further RS satellites constructed by amateurs in the Soviet Union.

E) As much as ten percent of the active amateur population will have some experience with AMSAT Phase III satellite use, and many of these radio amateurs will use the VHF and UHF satellite transponders exclusively in preference to operation on the HF bands.

F) AMSAT satellites will be used by IARU societies on a scheduled basis to relay official bulletins of their organizations and for code practice and special presentations. Traffic handling will be a regular part of satellite activity, and groups will be organized to handle emergency communications via satellite during disasters and other emergencies.

G) Digital communications techniques will begin to see wide use on AMSAT satellites as more amateurs set up personal computers and find new communications applications for them.

H) AMSAT satellites will be in regular use for classroom demonstrations and laboratory experiments, and will see wide use in stations in museums throughout the world.

I) AMSAT will become completely self-sufficient, not requiring support or funds from government or industrial organizations. Funding will be derived entirely from membership dues and satellite user services.

Although this outlook may be considered by some as highly optimistic, it would also have been difficult to predict ten years ago that by the year 1979 four OSCAR and two RS satellites would have been launched. Let's hope we can do as well in the future.

AMSAT PHASE III PROJECT REPORT

By Joe Kasser G3ZCZ

The European Space Agency (ESA) has formally notified AMSAT-Deutschland that the launch date stands at 5 March 1980 (when A-O-8 will be 2 years young). The spacecraft and all major ground test equipment must, however, be delivered to ESA Paris by 1 December 1979.

The weekend of 2-4 March 1979 saw the completion of another major milestone in the project development: a major ground station interface meeting was held at the AMSAT-OSCAR Spacecraft Laboratory. The hardware and software modules necessary for the ground stations were identified in detail and tasks assigned to the attendees. Amongst those taking part in the meeting were: W3GEY, W3IWI, WØPN, W6PAJ, G3ZCZ, DJ4ZC (by conference telephone), K1HTV, VE3SAT, WB1EYI, W9KDR, W3PK, W1HDX, W2FPY (by conference telephone), K1GP, K1JX, WA3MEX and Marie Marr.

The AMSAT Phase III ground stations are designed around S-100 Bus 8080-based microcomputers incorporating floppy disc systems using NorthStar hardware and comprise an integrated system of hardware and software. Programs will be written in IPS and NorthStar BASIC. Hardware has been prototyped for Telemetry, Tracking and Command (TT&C) applications. When the new revisions of the TT&C hardware are available for general use by AMSAT members, an announcement will be made in the AMSAT Newsletter. A special temporary authorization has been received from the FCC allowing on the air use of ASCII for spacecraft link simulations and ranging tests. The following stations were authorized to use ASCII by the FCC for the purposes of Phase III testing until February 1980: W3IWI, WA3MEZ, W3HCF, G3ZCZ/W3, WØPN, W6PAJ, WBØCOR, WØLER, VE3SAT/W6, W1HDX, WA3NDS and W3ZM. An additional station, K1GP is pending.

On 28 February 1979, W3IWI made the first FCC authorized ASCII transmission in the present series of tests by sending 110 baud data to G3ZCZ/W3. W3IWI transmitted Bell 103 compatible tones to G3ZCZ/W3 who copied them on a ST-5 RTTY Terminal Unit. Joe confirmed that the ST-5 would not print 300 baud data. W3IWI and W3HCF subsequently completed two-way ASCII transmissions to each other.

Two structures are being fabricated (two spacecraft are planned). Solar arrays are being fabricated both in Germany and hopefully in the U.S. also. 73 six amp-hour battery cells leftover from the RCA ITOS project have been received from NASA. They are in excellent condition even being within the current NASA date code. Battery charge regulators are being designed in Germany and Hungary.

The thermal design has been completed. We have a working computer model of the spacecraft that meets specifications. The spacecraft can withstand a three hour eclipse and half an orbit with the sun shining directly on the top or bottom of the spacecraft, these representing worst case thermal conditions. The design of the flight modules has been completed and a full size wooden model of the spacecraft is at the AMSAT-OSCAR Spacecraft Laboratory. It is hoped to use this to resolve conflicts in positioning of the various modules and as a model for fabricating the wiring harness.

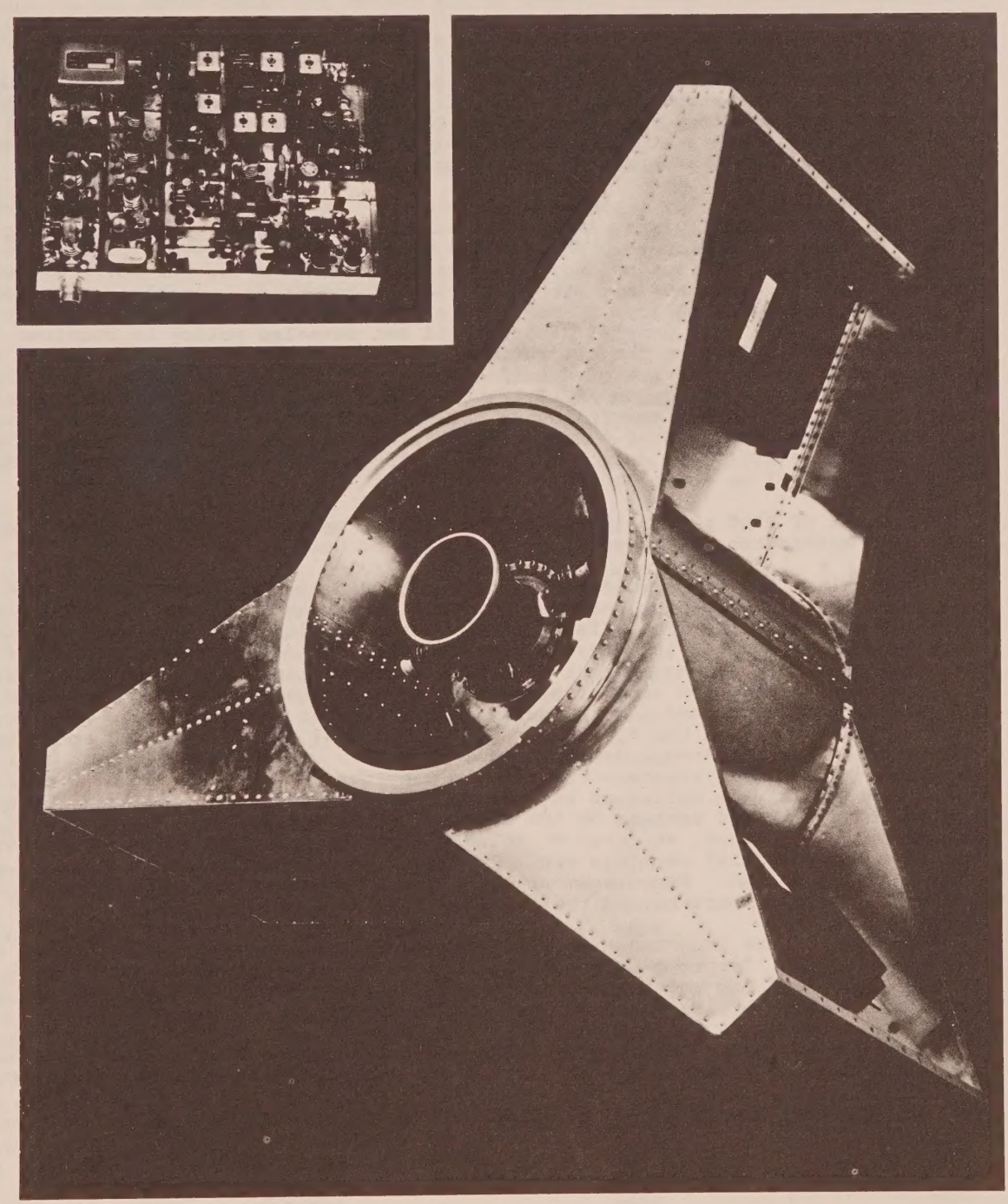
The first tests of the full 50 watt transponder are scheduled for March 1979. The transponder is being built in Germany using a 150 kHz crystal filter supplied by JAMSAT. The antenna designs are still not completed. There are problems in getting the two meter high gain antenna to perform as predicted by our computer model.

Worldwide tracking stations equipped with microcomputers and experienced with their use will be required at locations between 20°N and 20°S latitude during the first month following launch. We are in need of volunteers for help with this. If single stations are not suitably equipped perhaps teams could form to perform the orbital determination task. Large amounts of data will be required to accurately determine the orbit (we don't want to fire the motor when the satellite is pointing in the wrong direction). As such, RTTY would probably be the best method for relaying the data around the world. Stations equipped for RTTY are also needed. K1HTV is to coordinate these efforts. Please contact him if you are able to help out.

The characteristics of the communications link for users are such that circular polarised antennas will be necessary, and even then "spin modulation" effects may be noticeable. It is expected that the term "spin modulation" will enter the language of amateur radio. The path link requirements are otherwise expected to be similar to those of AMSAT-OSCAR 7 Mode B.

Thought has still to be given to the use of the spacecraft. The communications capabilities are unlike anything that has previously existed. Some section of the passband ought to be set aside for channelised SSB (Nets and Education) and digital use (RTTY and inter-computer communications). The current bandplan will be modified accordingly. Comments are solicited. Send them to K1HTV, in care of AMSAT.

In summary, AMSAT has developed hardware and software that can be used by any radio amateur to receive the high speed (400 baud) phase-shift keyed telemetry and information data from the Phase III spacecraft Engineering Beacon. Documentation is still under preparation and may be in German or in English. AMSAT will make this computerware available to radio amateurs and an announcement of their availability will be published in a future issue of the AMSAT Newsletter.



The AMSAT Phase-3 satellite showing the mounting of the modules and the centrally positioned kick motor

Upper left: prototype of a transponder

(AMSAT-DL photo)

MINUTES OF THE AMSAT BOARD OF DIRECTORS MEETING

March 12, 1979

Directors Present: Tom Clark W3IWI, Jan King W3GEY, Perry Klein W3PK,Will Webster WB2TNC

Others in Attendance: Clarke Greene K1JX, Marie Marr, Roy Rosner K4YV, Martha Saragovitz, Joe Kasser, G3ZCZ

The meeting was called to order at 8:24 PM EST. A quorum was not present until 8:35 PM.

The Board examined the current state of AMSAT finances in view of an expected major expenditure for solar array assembly. It was concluded that, although finances are tight, AMSAT is solvent. The issue of ground support equipment for initial orbit determination for the Phase III-A launch was debated. A complete assessment of the detailed cost is not possible at this time. However, this item is sufficiently critical that it must be resolved soon. A spending plan prepared by the General Manager was approved subject to review at a later time.

Current AMSAT employee policy was reviewed. In view of the tax complications involved in retirement plans, AMSAT will continue its policy of not providing retirement plans for employees. However, in view of the tax savings possible to individual employees who set up Individual Retirement Accounts, the Board encouraged the employees to consider this step. In view of recent snow problems, the Board adopted the following policy: "AMSAT has a flexible policy of personal leave and compensatory time. The General Manager will set detailed policy as required, but decisions will be left to the discretion of the employee whenever possible. Employees may request a review of specific cases by the Board of Directors". The Board also reviewed policy on AMSAT travel. In view of upcoming operations at the Phase III-A launch site, the following policy was adopted: "Employees who incur travel expenses on behalf of AMSAT will be reimbursed for actual expenses. The General Manager will have approval authority for nonprogrammed travel up to $250 or programmed travel up to $1,000."

Payment of $100 per month toward the cost of maintaining AMSAT's headquarters office in Washington was approved, retroactive to Oct. 1, 1978.

The Bylaws and items related to the functioning of the organization were considered. It was noted that the complete text of the AMSAT Bylaws including the latest revisions would be published in the March Newsletter. A protracted discussion of the roles of individuals who are both members of the Board and officers was conducted. It was noted that with this Board meeting, the proposed Bylaws revision allowing any five regular members to nominate candidates for the Board is in force. The Board adopted the following: "Two regular Board meetings will be scheduled each year in the Spring and Fall. The Fall meeting will be conducted in conjunction with the Annual Meeting. All directors will have the opportunity to be present and travel expenses for the two meetings will be authorized. Special Board meetings may be called as required." In the discussion, the need for timely notification of Board members on the date and agenda of meetings was stressed. The importance of presence, at least by telephone, of the non-Washington area Board members at any special meetings was emphasized. A discussion on the optimum size for the Board ensued. Encouragement was given to investigate ways to expand the number of Board members beyond the present 7.

In view of the importance of the upcoming WARC to the amateur satellite service, the Board: "approves the sending of a representative as an observer at the WARC to represent the amateur satellite service. The Board will approve the final details in adequate time to make final arrangements."

A proposal for an AMSAT satellite users handbook was discussed. The Board was interested, but requires additional details before giving formal consideration.

The meeting was adjourned at 12:37 AM EST.

Will Webster WB2TNC

THE AMSAT-OSCAR QSL BUREAU

By Ross W. Forbes, WB6CFJ

The AMSAT-OSCAR QSL Bureau is established as a service to help distribute QSL cards for contacts via the OSCAR satellites. This bureau will handle any number of QSL cards that you wish to send, to any station, for any contact via OSCAR. The Bureau's address is P.O. Box 1, Los Altos, California 94022.

To use the AMSAT-OSCAR QSL Bureau, just send your cards for distribution, and have an SASE on file: non U.S. stations should have an SAE with IRC's on file. Cards going from North American stations to other stations in North America can be sent to the AMSAT-OSCAR QSL Bureau for no charge. Cards from North American stations to stations outside of North America (KH6 not included) will be forwarded at the rate of 6¢ per card, or may be sent in bulk at the rate of 20 cards for $1.00 in U.S. money; money for forwarding cards only, do not send stamps to cover forwarding fees. Cards from stations outside of North America wishing to send cards to stations within North American can do so for no fee. It all comes down to if a station has an SASE or SAE and IRC's on file, it costs nothing to send the card to the station via the AMSAT-OSCAR QSL Bureau. Stations outside of North America are welcome to use the bureau and to keep an SAE and IRC's on file for incoming cards.

STATIONS WITH QSL CARDS ON FILE IN THE AMSAT-OSCAR QSL BUREAU BUT NO SASE

These Cards May Be Returned to Sender After June 1, 1979

N1AF	K4EYG	W7EEC	WB9RJA
W1BB	K4FKJ	N7EF	K9SLQ
W1CBZ	W4GCB	W7FG	W9SVE
W1CEZ	W4HDX	W7HAH	W9VZU
N1DM	WA4KKY	W7HGR	NØAN
K1FNA	K4KQ	W7JMA	KØCLD
W1IAS	K4LTA	W7KJ	WØDF
WA1UHA	K4MSK	K7LCR	WØEOZ
WA1UQC	WA4NFY/Ø	W7MCT	WBØGAI
W1VW	WA4NKN	K7NH	WØHHE
G8VR/W1	N4PY	K7NTV	WØHPW
K2ECL	W4YU	WB7RHF	KØMTY
K2EK	K5CM	W7TPD	WØPEC
W2EQ	AA5E	WA7UQV	WØPM
W2GFF	N5EH	K7UT	WØPW
W2GN	W5FQQ	W7XN	WBØRCX
W2MRB	W5HI	K7VNU	NØVA
K2QDY	N5LL	W8ANN	WØVHQ
W2RV	WB5MEV	K8BL	NØXA
K2UFA/5	W5NU	K8CTM	WØXR
WB3AWJ	WB5RBM	K8EF	WBØZYR
N3AY	K5VWW	K8EM	KH6BTV
W3BHG	W6ABN	W8IDN	KH6GMP
WB3CZG	K6AM	W8IDU	KL7JAF
W3HV	K6BPT	N8II	KV4FZ
K3MKZ	WA6BTX	N8LM	PJ2MI
K3NW	K6CH	W8MV	VE1KG
W3QBK	N6CR	W8MZB	VE2IB
K3SXA	W6EJJ	WA8NYT	VE2JR
K3TNM	WA6JQN	W8TCO	VE3ATM
W4ACX	W6KH	W8VST	VE3EVW
K4AC	WB6OWF	K8WKZ	VE3FJQ
K4AM	W6OWL	N9AB	VE3FWC
N4BB	WA6QQQ	K9BED	VE3PN
WA4BUE	K6RK	K9DID	VE3TAT
K4CAW	W6TLY	KB9DU	VE5DX
K4DM	WA6UAP	W9ERW	VE6AHH
W4DO	WB6WLR	WB9FNR	VE7BLF
WA4DYL	W6WNK	W9HR	VE7IO
N4EL	WB6ZHH	W9NKF	
K4EVH	WB6ZQY	WB9QCP	

If you work one of the above, remind him/her to send an sase to the AMSAT QSL Bureau, Post Office Box 1, Los Altos, CA 94022.

BRITAIN'S FIRST AMATEUR SPACECRAFT TO BE BUILT AT SURREY UNIVERSITY

The University of Surrey's Telecommunications Research Group has embarked upon a project to build Britain's first amateur spacecraft. It is working in conjunction with the international Radio Amateur Satellite Corporation (AMSAT) and with the active support of Britain's electronics, telecommunications and aerospace industries.

The new satellite, to be built at Surrey University, will be Britain's first contribution in flight hardware to the amateur space programme. Its features will be a departure from those of the OSCAR series. The details of the special features and experiments that it could carry are still under discussion, but it is hoped to provide a facility to enable radio amateurs all over the world to study the effects of the ionosphere on radio propagation. It may also include features enabling educational establishments to carry out practical experiments with it, thus stimulating a new practical interest in the space sciences.

The construction and testing of the satellite will take about two years. It is intended for a polar orbit at a height of 900 km, and a possible launch opportunity exists early in 1981.

The cost of the satellite is expected to be around $300,000 and support for the project is being provided in cash and kind by the following organisations: The Radio Amateur Satellite Corporation (AMSAT), Appleton Laboratories, British Aerospace, Ferranti, Marconi Space and Defence Systems, M.E.L., Philips Research Laboratories, The British Post Office, Racal, The Radio Society of Great Britain and The Royal Aircraft Establishment.

AMSAT GRATEFULLY ACKNOWLEDGES DONATIONS OF $100 OR MORE FROM THE FOLLOWING NEW LIFE MEMBERS

LM-990 Fred W. Atkinson III, WB4AEJ
LM-991 Charles T. Storm, WBØJLP
LM-992 Pierre Catala, HH2PR
LM-993 J.E. Swafford, W7FF
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LM-1004 Ralph E. Covington, Sr. W7SK
LM-1005 David Tkach, KB8FF
LM-1006 Charles M. Heiden, W4MJY
LM-1007 Hans Eriksson, SMØHBH
LM-1008 John L. Schroeder, N6QQ
LM-1009 M.S. Ruttan, VE3GDX
LM-1010 Stephen D. Green, WB7WQZ
LM-1011 William B. Danser, WA3YLG
LM-1012 E.T. "Will" Williams, K9DZ
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LM-1015 Albert Hix, W8AH
LM-1016 Gene Mitchell, K3DSM
LM-1017 William D. Price, WA4MCZ
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LM-1019 Henry J. Smith, N3AEQ
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LM-1021 Eugene Walter, W2CP
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LM-1033 W.F. Mantey, W4CSS
LM-1034 George Murphy, K3RQ
LM-1035 Michael Cozzolino, W6QUV
LM-1036 Rich Dunham, LAØCD
LM-1037 Peter J. Clark, WA3QMK
LM-1038 Henry Bervenmark, SM5BVF
LM-1039 Ed Mahoney, N4WZ
LM-1040 Erwin Petersen, Avoca, Iowa
LM-1041 Christian Poumier, F6ECI
LM-1042 Wolfgang Wetz, HB9PCX
LM-1043 Robert Grisch, HB9ER
LM-1044 Dr. Erich Hofling, HB9BFS
LM-1045 Epifanio Rodriguez-Velez, KP4BCQ
LM-1046 Larry Roberts, W9MXC

"....and we would like dinner between the LOS of OSCAR-7 and the AOS of OSCAR-8, or between the LOS of OSCAR-8 and the AOS of RS?....

(OSCAR NEWS, Winter 78/79)

A CALL FOR VOLUNTEERS FOR AMSAT

By Richard Zwirko, K1HTV
Vice-President, Operations

From time to time, a call, "Why can't AMSAT do this or that", or provide this service or that service to its members, is heard by many of the AMSAT gang of dedicated workers. Well, the question really should be asked of the questioner: "If you want this service badly enough would you be willing to head a group that can get the job done?"

What I'm trying to say is that what AMSAT really needs is more of YOU contributing whatever you can, to better AMSAT.

ALL of us have talents. We who are already involved in AMSAT are sharing our talents with the rest of the membership, some in a very visible way, and others in ways which probably are never realized by the vast majority of the members. Besides the list of AMSAT Directors and Officers which can be found in the Newsletter are dozens of others who have volunteered their services to perform the tasks which must be done in order to make AMSAT more than just a name. Some of the tasks involve work on construction, telemetry gathering and analysis, microcomputer hardware and software, awards, bulletin transmissions, nets, writing, demonstrations, financial advising, fund raising, correspondence with members, mailing labels, compilation of the membership list, orbital calendar preparation, printing and distribution, Newsletter editing, typing, legal counsel, QSL bureau, listener reports, users directory, solar cell contribution certificates, donation processing, telecommand station operation, AMSAT repeater control and operation, AMSAT directory preparation, liaison with various businesses and international radio amateur organizations, AMSAT Area Coordinators, and many others.

With the upcoming launch of the AMSAT Phase III satellite, now scheduled for March, 1980 there will be a need for a number of volunteers in several different areas of experience. Beginning with the launch and extending for a period of about four weeks will be a need for accurate measurement of range, range-rate (Doppler), and other data about the satellite as well as people to gather and retransmit this data in a form which can readily be used at AMSAT Headquarters. Stations will be needed to set up networks for relaying this data as well as to disseminate news and information about the satellite.

AMSAT is made up of more than just satellite designers and builders. We require so many more different types of workers in order to function. Presently, there are four paid workers at AMSAT. Two working exclusively on the Phase III project, and the other two working at AMSAT Headquarters. The rest of the work is done by volunteers. How about being one of them?

If you have anything to offer in any area which will make AMSAT a stronger and better organization, please step forward. Most of us already have our hands full with our present commitments to AMSAT, so don't ask us to provide more services. Why don't YOU come forward and join the ranks of the volunteers and tell us just what YOU can offer in the way of service to this great organization. I personally am very proud to be a part of this facet of Amateur Radio, which is contributing so much to the future of communications. Why don't YOU join us? Contact AMSAT at Box 27, Washington, D.C. 20044.

CALL FOR NOMINATIONS TO AMSAT BOARD OF DIRECTORS

The date of the AMSAT 11th Annual Meeting has been set for Saturday, October 6, 1979 at the NASA Goddard Space Flight Center Employees Recreation Center, Greenbelt, Maryland. All AMSAT members and their guests are invited to attend. The meeting will be preceded by tours and a dinner. Further details will be in the June Newsletter.

Through a recent change in the AMSAT Bylaws, candidates for the AMSAT Board of Directors may now be nominated by a letter of nomination signed by at least five AMSAT members. (See Article V, Section 2 of the Bylaws, reprinted in this issue of the Newsletter). The deadline for submitting such nominations is May 15 so that the names can appear on the ballot to be included in the June Newsletter. Candidates (who must be current AMSAT members) will be asked to fill out biography forms so that background information may also be published in the June Newsletter. Please contact us immediately for the biography form if you are considering making or accepting a nomination for the Board.

A REAL-TIME TRACKER FOR RS

By Pat Gowen, G3IOR

When one is pre-occupied during the course of a live orbit, with tuning the transmitter, receiver, correcting for Doppler, adjusting power levels, changing polarization, correcting for azimuth and elevation, entering the log, any additional work such as is imposed by continuously calculating the track by mathematical means or by serialized time addition is an extra burden that detracts from concentration upon more vital factors.

By employing the IARU equidistant polar map (obtainable from G3AAJ for $2.00, post free) a simple to use and equally simple to build real-time plotter can be made for any satellite. For sun-synchronous orbits, such as OSCARs 6, 7 and 8, the centre of the track circumference is such that a pivot can be used adjacent to the plot board, as in the tracker made by W2GFF.

With RS, the track is virtually straight, and this method cannot be employed, unless a plot-board is constructed that would only fit the most spacious shack. The system described here is a simple means of overcoming all difficulties.

Obtain two pieces of white stiff card 28 cm square. On one, stick the IARU map, and carefully cut out the circle formed by the 30° south line (NOTE - NOT the equator line). Now draw onto this the horizon ellipse, the greater range horizon, and the bearing marks as on Fig. 1. The precise centre of the circle, e.g., the point at the centre of the crossing lines should be exactly over the location, and the centre to north line be pointing due North, (magnetic if your beam is so aligned, or true, whichever you go by). This ellipse is more than true enough for stations located between 45° and 65° North, but it would be better to calculate the true ellipse and bearings for those further South or North. The major continents and islands within the outer circle can now be painted or crayoned in red to indicate the greater access area readily. Now mark a neat hole through the North pole, and using a pop-rivet , eyelet, brass-paper clip or even a nut-bolt-washer combination, pin through the second piece of card so that the circle is equidistant between the top and the bottom, but projects some 15mm over the left-hand edge. Now you need to firmly mark the °W round the edge of your map starting at 0°/360° at due South, every 10°, through West at 90°W, all the way round till you finish up at 350°W and back to your starting point. You should now have something like Fig. 2.

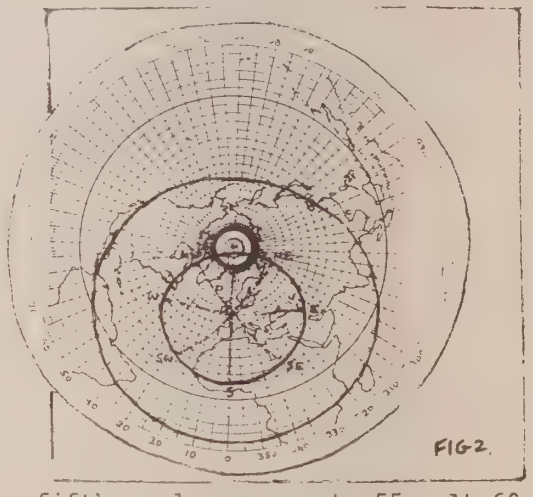


FIG 2.

The next job is to locate a length of polyacrylate sheet, or some similar clear plastic sheet. Some old cleaned X-ray film will do if you cannot get it at the art-shop where you get your card. First cut a 57cm long strip 20mm wide, and draw a line down the centre marked every 3mm and then put an 0 on the first, 5 on the fifth, and so on up to 55. At 60 start with a 0 again, and so on until you have completed the strip, to look like Fig. 3. This will form the minute position marker when complete.

The next job is to cover your plotter with the remaining plastic sheet, either by cutting out a 28cm square section, and sticking it round the edges, only leaving the left-hand edge so that the polar map is free to rotate, or, by covering the whole plot. Heat sealing, or impact adhesives are the most suitable for most plastics.

Now we shall fit the cursor, formed by our minute marked strip. This is done by cutting with a scalpel or single edged razor blade, a slot 20mm wide in the plastic cover, at the right places, to accept the strip. If you have followed the dimensions given so far, you will cut one slot 5mm across starting from 12cm, finishing at 14cm set 1cm down from the top edge, and another from 9.5cm going to 11.5cm set 1cm up from the bottom edge. Into the top edge we insert the '0' marked leader end of the strip so that it goes under the cover, across the map top to bottom, and comes up and out again through the bottom slot. Pull it through a way, and join the ends of the strip under the board, so that it is now free to pull through as a continuous loop.

Just to check that you have everything as it should be, check that it looks like Fig. 4 where an orbit cutting the equator (note... equator... not the edge of the map...) at 0° (360°) at n hours 39 minutes comes into the range (visibility) circle at 43 minutes, is TCA at 56 minutes, leaves our access circle at 8.8 minutes

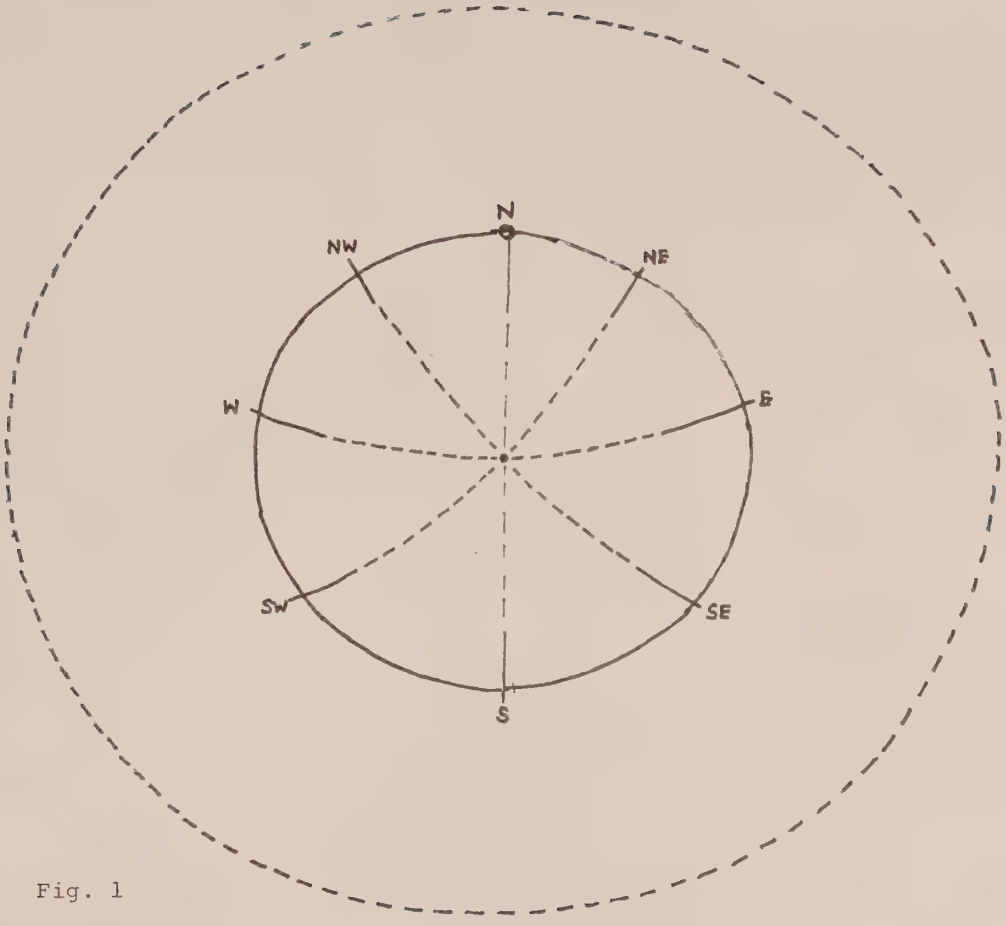


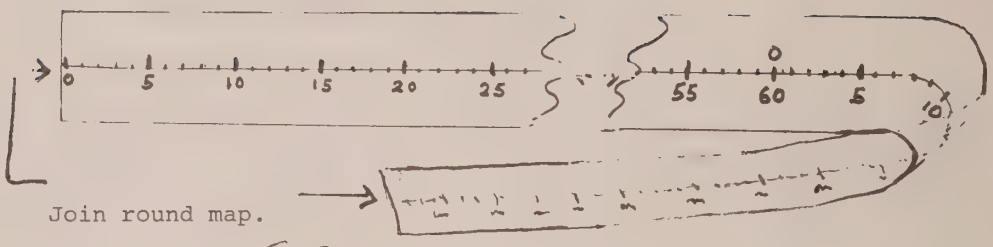
Fig. 1

after the following hour, goes over the outer range circle at 24 minutes past, over the extreme far equator at 40.2 minutes past at 195.1°W, and leaves the map edge at 50.5 minutes at 193.4°W. As a further check, a directly overhead ascending orbit will emanate from 12°W, say at 00, comes into range for us at 04.2 minutes, TCA at 18 min for central England, and leaves our access NNE at 30.7 minutes, finishing over the Pacific equator at 58.8 minutes.

Now all we need to do is to put an arrow at the lower equator line saying "set time eqx" where the equatorial crossing time in minutes is set up, and another with "set °W" where we rotate the map circle to give the equator crossing in longitude °West for the particular orbit, taking care that it is actually at the equator, and NOT the outer edge of the map, by using a vertical line from the outer edge mark to the equator itself.

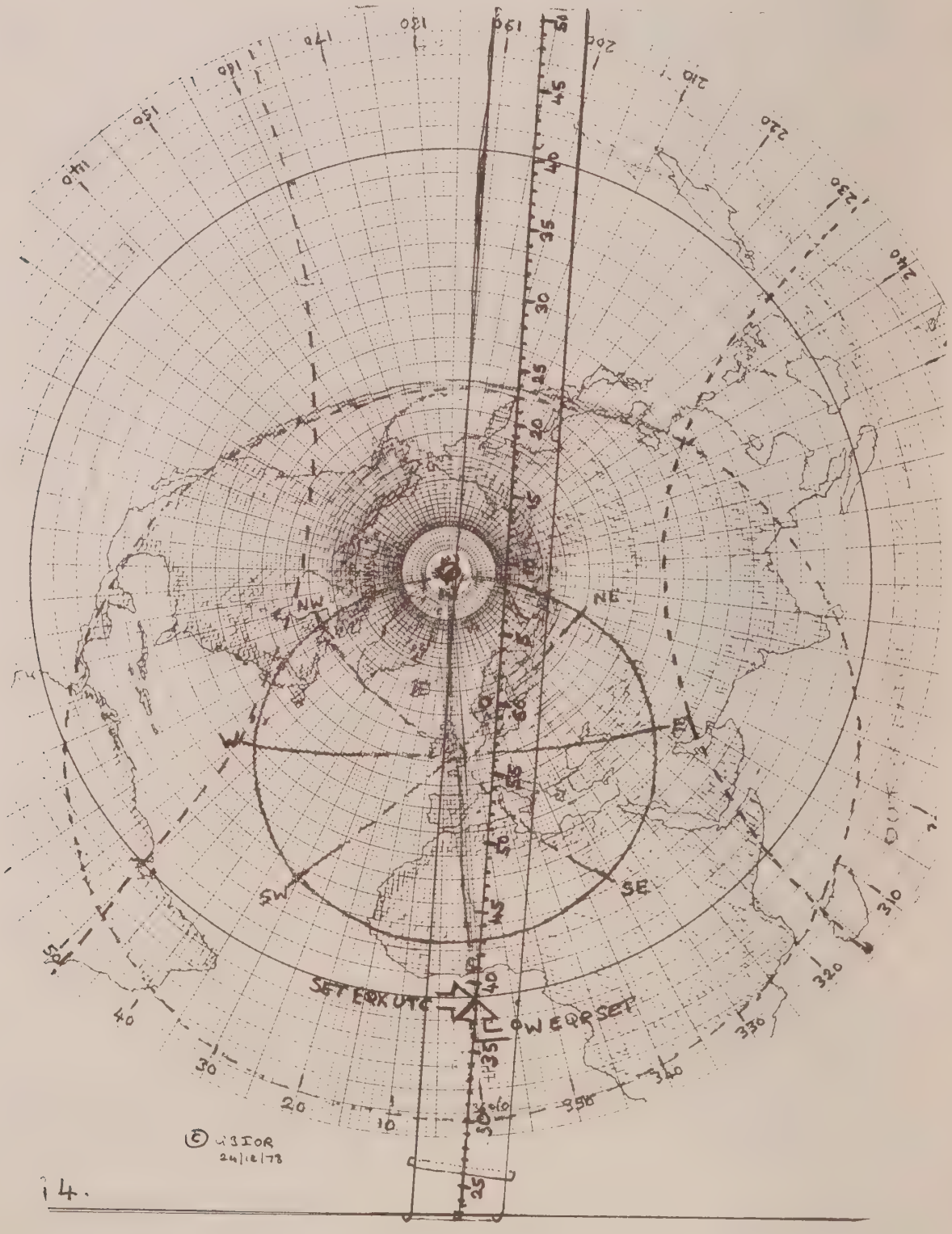
We can now add further refinements on the outer plastic cover with an indelible marking pen, e.g., if we set °W eqx at 0, we can put a pointer at 30.23°W marked "next orbit", another at 60.46°, and so on, thus immediately permitting the setting up of the following orbit. As the time is only a few seconds greater than two hours, we can almost leave the time strip where it is. (Idealists please add 0.3 minutes). By this means, one reference orbit per week will set you up well within the limitations of your beamwidth, clock, and propagation anomalies.

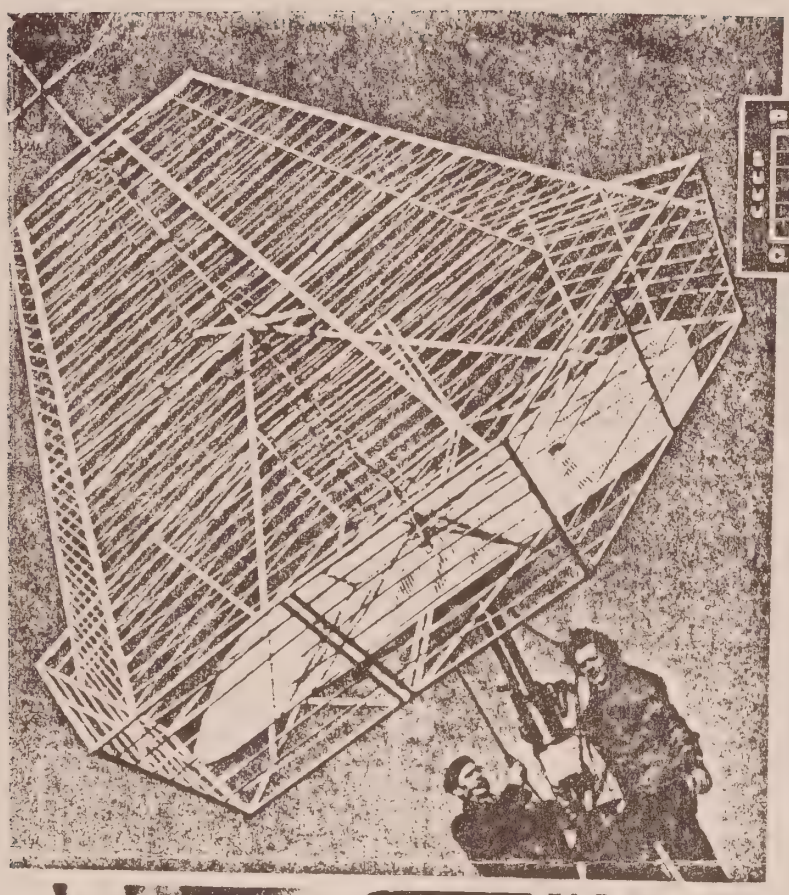
A further advantage is to draw on the plastic cover the area out of range, by semicircles formed by using the latitude corrected access circle against the satellite track. (See dotted lines on Fig. 4) and shading the outer areas. These will hold true for any orbit as you rotate, and on the proviso that RS is within your access (inner) circle, will tell you exactly what you may work (or make a schedule with) on any orbit. It will also permit you to evidence any abnormalities of propagation. Mark the areas you have shaded as "out of range for this orbit". Also, you have now a means of telling the times and possibilities of the other guy's, hence mutual, access time, and this is the way to contact those rare ones at the extreme limits.



Join round map.

Fig 3.





Правда

РС—ПОЗЫВНЫЕ ИЗ КОСМОСА

Сообщаем подробности

Известия

РОВЕСНИКИ КОСМИЧЕСКОЙ ЭРЫ

Социалистическая индустрия

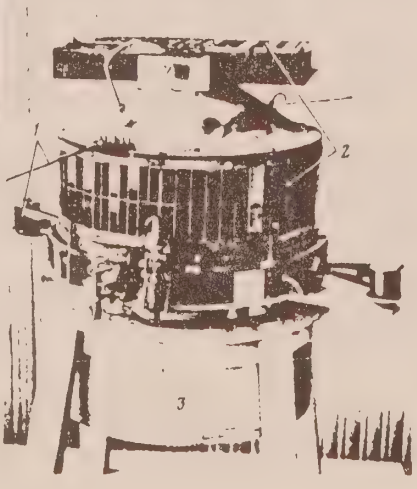
СТУДЕНЧЕСКАЯ ОРБИТА

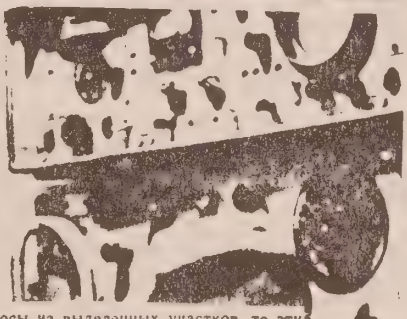
Труд

КОСМИЧЕСКИЙ РАДИОМОСТ ДЕЙСТВУЕТ

На снимках: антенна Центрального приемного командного пункта ДОСААФ СССР; слева — оператор UK3ACM Г. Шульгин проводит первые связи через ИСЗ; справа — по диаграмме слежения определяются сеансы связи

Фото М. Анучина и Г. Никитина





IARU РЕКОМЕНДУЕТ...

Для радиолюбительской связи через искусственные спутники Земли выделены определенные участки диапазонов, например, 145,8...146,0 МГц (работа на передачу с Земли) и 29,3...29,5 МГц (прием сигналов с борта ИСЗ). С целью уменьшения взаимных помех между радиостанциями на последней конференции 1-го района IARU (апрель 1977 г., Венгрия) были даны рекомендации по делению «космических» участков любительских диапазонов по видам излучения. Поскольку конкретные ретрансляционные ИСЗ могут использовать и более узкие полосы из выделенных участков, то эти рекомендации даны в общем виде — в процентах по отношению к ретранслируемой полосе частот (рис. 1).

Излучать сигналы в узких участках *1* и *2*, расположенных по краям ретранслируемой полосы, нельзя, так как в них находятся рабочие частоты маяков. Участки CW и SSB отведены для работы исключительно этими видами излучения, а в участке MIXED можно работать как телеграфом, так и однополосной модуляцией. Этот же участок рекомендуется использовать станциям, имеющим передатчик с фиксированной частотой (без VFO или VXO), и DX-экспедициям.

Распределение частот в пределах ретранслируемой полосы по видам излучения для радиолюбительских спутников «Радио-1» и «Радио-2» приведено на рис. 2.

Следует отметить, что данное распределение ретранслируемой полосы по видам излучения введено для приемного канала сигналов на Земле. Для ретрансляторов, в которых не происходит инвертирования полосы пропускания (такие установлены на «Радио-1» и «Радио-2»), подобное же распределение частот сохранится и при передаче. Для ретрансляторов с инвертированием полосы (в принципе, возможно и такое их построение) распределение по видам излучения на передачу станет как бы «зеркальным»

Рис. 1

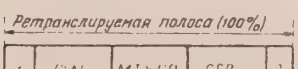
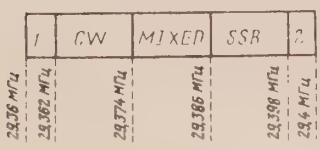


Рис. 2



MORE ABOUT "RS"

By Pat Gowen, G3IOR

Since the publication of my article about the Soviet Union's pair of amateur-radio satellites in the December 1978 issue of the "AMSAT Newsletter", a few more facts have emerged that will be of interest to enthusiasts... what one might call a PS on RS!

Further information has been published in the Soviet press, mainly "Soviet Patriot" and the answer to many of our questions has been supplied by RS3A over the 0800 Saturday net on 14.270 MHz. Furthermore, the study of many more orbits from both "RADIO-1" (RS-1) and "RADIO 2" (RS-2) has produced further insight into their retranslation and their telemetry characteristics.

One article evidenced the large amount of work that went into the preparation of the satellites prior to launch, giving many sleepless nights to the DOSAAF construction team.

"The satellites are the result of many months of intense work by employees of the Laboratory for Space Technology of DOSAAF and by members of student construction bureaus. The construction of telemetry systems and transponder and reception/transmission equipment for the satellite required a great deal of work under pressure, a huge amount of creative energy and devotion to the dream of radio amateur enthusiasts. Many alternatives were tried and rejected, after stormy discussions, as not being promising. Finally, original solutions for all problems were found and the effort has been crowned with success.

"Alexander Pavlovich Popkov added to this, saying that the search continues since this launch opens up great prospects for the establishment of radio amateur communications in space. Popkov is a member of the Laboratory of Space Technology of the Defense Society and is an operator at the reception-command point, receiving information from the telemetry systems of the satellites. It was he who had the job of developing the telemetry system, and only the 8th variation tested got the go-ahead.

"The purposes of the satellites are primarily to provide communication for radio amateurs, for use by students of higher educational institutions in carrying out scientific and technological experiments, and for use in teaching work.

"Came 26 October, and the successful launch, and back at the USSR Command center at the University of Moscow, Leo, UA3CR, Vlad, UA3DV and the rest of the keen group were anxiously awaiting the first telemetry signals, which were received following completion of the second orbit. The moment of truth arrived on the third orbit. The command station crew initiated separation, or, as Vladimir Rybkin put it "... we successfully fired off..." the satellites, and they began to function independently of the mother craft. After unclamping, the antennas of the spacecraft unfolded, and the telemetry receivers of the monitors were manned and active.

"The operators of the command center rapidly worked through the telemetry and decoded it, and soon reported that all systems were working as hoped for. Peripheral command centers were established also, with a shortwave link between them and the Moscow main command (1)."

The main control and the command center in Moscow is RS3A, with the second, RSØA, at Arsenev by the Sea. The third, RS3B is a fully portable command station that may be employed mobile at any desired site.

In all, up to nine separate commands are possible to the spacecraft, including beacon on or off, separation, on or off of high speed telemetry, and full or part frame of normal Morse Code telemetry.(4)

The command receiver is common with the uplink receiver, but the command signals are taken out separately from the IF strip, whereon they are decoded by the logic, deciphered, and go out to the corresponding equipment, indicated by the telemetry. As the suffixes 'R', 'S', 'D', 'O', and 'G' are only heard when the satellites are within range of the Moscow command station, it is apparent that these are in use specifically to indicate the function receipt. It should be noted that all of the three character 'letters' are employed here. When 'R' and 'O' are heard (in addition to 'W' as normal) the transponder is found to be ON, but 'D' and 'S' occur when it is OFF, as with 'U' and 'K' under normal running.

The high-speed telemetry, briefly mentioned in the first article, is now clearer. To quote "RADIO" No. 1, 1979: "... In Radio-1 (only) is a rapidly acting telemetry system...in response to earth command it is enabled to transmit

information with a capacity of 256 bits at a rate of 50 baud for reception by teleprinter..." RS3A indicated that this was a fixed frame, carries no variable content but is sent to ascertain the number of errors that can occur when high speed data is sent from space. Already, some excellent work in the study of this by K1HTV and WA2LQQ has produced an excellent correlation to the radiation count that might be expected from a scintillation counter running in the high-radiation Van Allen belt where RS is situated. It is a very profound treatise, and the space is not available for a fully detailed explanation here.

It would be very surprising to find that such a system would be placed aboard merely to discover the error rate printed due to the effects of signal shaping by its traverse through the Van Allen belt, the F1, F2, E and D layers, plus tropospheric and auroral effects, when this could simply be determined from the oscilloscope observed character presentation of any normal Morse character, and we are still wondering if this was a system which was working and has since failed by jamming, or if it is only temporarily commanded off. The early results obtained by Rich and Rip if a fixed frame is assumed, could be the effects of radiation upon the depletion layers, and it could be the multi-path effects probable over a highly ionized path that elongate the shorter elements to give longer that increase the binary content, but further study should give this answer.

The report of the means of decoding the normal Morse Code telemetry on board RS-1 needs some further explanation in order to update true values.

The equations for temperature, Channels 03 (F), 04 (Z) in the first semi-frame and channel 21 (B) in the second, only hold if the value of the number is equal to or greater than 20 (N=20). For low N values, the formula to use is $T^{\circ}C = (3N)-40$.

The illumination pick-up sensors only function correctly when the solar batteries are disconnected from the batteries, i.e., the current of the charge (Channel 15 (S) and 22 (H)) is equal to zero.

The formula for Channels 16, 17, 18 and 19, giving the battery voltages of the No. 1, 2, 3 and 4 batteries respectively, should have had brackets inserted to clarify, e.g., Battery Volts = 0·2(N + 12) where N is the number transmitted, whilst a better translation for channel 21, given last time as "battery charge resistor temperature" would be "battery charge regulator temperature" which is much more meaningful.

The telemetry from RS-2 differs, as although channels 1, 2, 3 and 4 (P, C,F and Z)are similar, channels 5, 6 and 7 (L, B and H, all on the first sub-frame) differ. They still show voltages, but this time the battery is divided and measured as upper and lower halves relative to a centre. Channel 5 (L) indicates the upper half, e.g., centre to high potential, and at this time Channel 6 (B), will read 01, and Channel 7 will read the whole battery value. If Channel 7 is reading 01, then, at this time Channel 6 will read the lower half of the battery. At this time, Channel 5 will give a negative reading and is only of value and correct when it is greater than 10.5 volts shown (2).

Apart from the telemetry differences, RS-2 has a very slightly faster Morse CW speed than its sister, and the frequency of the telemetry is about 15 Hz. higher (3).

RS-2 is not quite so sensitive as RS-1, estimated by your author to be in the region of about 12-15dB. The result is that it tends to stay on and active when in range of Europe, and provides many QSO's over the area. It was interesting to note that on Saturday 16 December it was on, active, and used on all orbits, and provided lots of excellent contacts with the better operators. On Saturday and Sunday, we put the orbital information out, and the fact that it would be on. It was noticeable that on Sunday it was blocked and put off.

It is interesting to note that in the RS-3 satellite, due for launch next year, a special attenuator pad would be placed in the spacecraft receiver that could be commanded in for Western Europe passes by ground command, and switched out again for passes over areas where more sensible powers are employed. (2)

Apart from telemetry differences, RS-2 differs in its size, construction, source of power supply, type of solar battery, and in the encapsulation of on board equipment. The retranslational characteristic, command and telemetry system are common as are uplink and downlink to both spacecraft.

RS-2 incorporates an experiment investigating thermo-regulation in non-hermetically sealed space systems, inasmuch as its 390mm. high 420mm. diameter 40 kilogram cylinder is unsealed. Aboard is a semi-active system ensuring a given heat-regime, consisting of a screen-vacuum heat isolation system, a radiator emitter, and a heat-bridge giving automatic thermo-regulation function.

As the temperature of the plate approaches 30 - 35°C, an automatic function constricts the heat-bridge across the cold radiator and the emitter permits a leak-out of excessive heat. As the temperature decreases below 10 - 15°C, the bridge is disconnected, and the on board plate is isolated with respect to the body heat-screen vacuum isolation system. (4)

No high speed telemetry is aboard RS-2.

The logic systems on both spacecraft demand only 1 ma. of current whilst resting, with a 20 millisecond burst of 50 ma. upon activation. (4)

The sensitivity of the RS-1 receiver is quoted as requiring 0.5 microvolts for 100 mW. output from the ten metre transmitter, which is capable of up to 1.5 watts total output before non-linearity, hence loss of transponding occurs.

As to powers to employ, here is the direct translation of an article on using RS by V. Dobrozhanskii, President of the Satellite Communications Committee of the USSR Radio Sport Federation.
"...strict limitation of the power is necessary... 50 - 100 mW must not be exceeded. At this level, it will permit twenty stations to give a total of up to 1.5 W. If earth stations significantly exceed these limits, the transponders will go non-linear, and cease all function. One of the main conditions of work is this strict discipline in observing the accessible level of emitted power of the terrestrial radio station. The useful re-translating power (proportional to the accepted signal) must never exceed 50 - 100 mW. If, at the limiting slant range to the sputnik, signals from the terrestrial station correspond to these, then, in relation to how close it gets, the power of the ingoing, hence the outgoing, signals will grow, which can lead to overloading. Therefore, in a session of communication, it is necessary with the change in the slant range of the satellite, to correspondingly change the radiated power. A suitable criteria of accessible earth uplink power can be the comparison of receptive levels of your own signal relative to that of the beacon.... AT NO TIME SHOULD YOUR OWN DOWNLINK BE STRONGER THAN THAT OF THE BEACON....." (1).

In the"RADIO" No. 1 article on the RS satellites, some information is given on the technical details. The receiver uses a -90 dB rejection filter in the front end, which is in class "A", to produce a 8.4 MHz IF. A 40 kHz wide quartz filter is employed, giving better than -40 dB rejection outside the 40 kHz passband. A crystal oscillator is used, multiplied by x5 to give a 154.3 MHz signal at the mixer stage. A ring balanced mixer converter takes the signal to two linear cascades, the first amplifier on ten metres working in Class "A", with the output stage in Class "B". All signals above 40 MHz are attenuated by greater than -100 dB from the output. (4)

The actual measured translational relationship is 1 kHz high, e.g., 145.890 MHz gives 29.371 MHz, and 145.910 MHz gives 29.391 MHz.(3)

The maximum Doppler total, additive uplink and downlink, as the transponder is non-inverting, is 4.1 kHz on an overhead pass. (3)

The RS-1 antenna system uses an inverted "V" dipole for two metres, and a quarter-wave whip for ten, whilst RS-2 appears to have a straight half-wave dipole for two metres, and a folded dipole for ten metres.

At the time of writing this article, neither satellite is on for two-way transponder QSO's, as they are just coming out of a minimum sun period when both temperatures and battery levels were very depressed.

RS-2 has developed a bad cell on one battery, which will preclude its use for transponding, although the TLM will still be available. The RS-1 satellite seems badly down on two of its batteries, but it is hoped that these levels will improve with increased charge and that the transponder will soon be available again.

I would like to thank and acknowledge the following who have helped in providing some of the information in this article:

UA3CR for information via the "Radio" nets on many occasions.
LZ1AB and UA3CR for press cuttings from Soviet literature.
SMØDZL for the photocopy of "Radio" magazine.

(Continued on Page 39)

AMSAT™

Radio Amateur Satellite Corporation

P.O. BOX 27, WASHINGTON, D.C. 20044

BYLAWS OF THE

RADIO AMATEUR SATELLITE CORPORATION

(AMSAT)

ARTICLE I - "NAME AND DEFINITION"

Section 1

The name of this organization shall be: Radio Amateur Satellite Corporation (AMSAT).

Section 2

The organization shall be a non-profit scientific corporation, incorporated in the District of Columbia.

ARTICLE II - "PURPOSES AND OBJECTIVES"

Section 1

The purposes and objectives of the Radio Amateur Satellite Corporation are:

A. To provide satellites that can be used for amateur radio communication and experimentation by suitably equipped amateur radio stations throughout the world on a non-discriminatory basis.

B. To encourage development of skills and the advancement of specialized knowledge in the art and practice of amateur radio communications and space science.

C. To foster international goodwill and cooperation through joint experimentation and study, and through the wide participation in these activities on a noncommercial basis by radio amateurs of the world.

D. To facilitate communications by means of amateur satellites in times of emergency.

E. To encourage the more effective and expanded use of the higher frequency amateur bands.

F. To disseminate scientific, technical and operational information derived from such communications and experimentation, and to encourage publication of such information in treatises, theses, trade publications, technical journals or other public media.

ARTICLE III - "MEMBERSHIP, DUES AND PRIVILEGES OF MEMBERSHIP"

Section 1

Membership shall be open internationally to any person or group indicating an interest in supporting the purposes, objectives and activities of the Corporation. An applicant for membership shall complete an application form and membership shall become effective upon receipt of membership dues.

Section 2

There shall be two classes of members. The designation of each class of member, the qualifications and rights of the members of each class and their voting rights are as follows:

A. A Member shall be a person who demonstrates interest in furthering the goals of the Corporation by filling out an application form and paying his annual dues. A Member shall have the opportunity to participate in the activities of the Corporation, to hold office and shall be entitled to one vote for each position to be filled in the elections for the Board of Directors.

B. A Member Society shall be a recognized group, club or organization which participates constructively in the activities of the Corporation. To attain the status of a Member Society, the organization shall submit a Member Society Application form signed by an authorized officer of the organization. A Member Society shall be entitled to nominate two Members as candidates for the Board of Directors of the Corporation.

Section 3

Member dues shall be ten dollars ($10.00) per annum. Dues for each additional member of the immediate family shall be two dollars ($2.00) per annum. Annual dues for Member Societies shall be twenty dollars ($20.00) per organization. Organizations which become members in the first year of activity of the Corporation shall be designated "Charter Member" Societies. Dues may be waived on an individual basis at the discretion of the Board of Directors. A minimum of one renewal notice shall be sent to Members and Member Societies at least sixty days prior to expiration date.

ARTICLE IV - "ELECTED OFFICERS, COMMITTEES, APPOINTED OFFICIALS AND THEIR RESPONSIBILITIES"

Section 1

The general policies of the Corporation shall be established by a Board of Directors.

Section 2

The Board of Directors shall consist of seven Members of the Corporation. The Directors shall be elected by the Membership at the annual meeting for a two-year term. Four Directors shall be elected in odd numbered years; three shall be elected in even numbered years. The Directors shall assume office immediately upon election.

Section 3

The Board of Directors, at their first meeting following the annual meeting, shall elect the Corporate Officers. Newly elected officers shall assume their respective offices immediately upon their acceptance. The retiring officers shall be responsible for assuring the effective transfer of records and responsibility to the incoming officers.

Section 4

Officers of the Corporation shall be the President, Executive Vice President, Vice President - Engineering, Vice President - Operations, Secretary, and Treasurer. Additional Officers may be elected by the Board of Directors at the discretion of the Board.

Section 5

Duties of the Officers:

A. The President shall be responsible for presiding over the membership meetings, coordinating all activities of the Corporation, authorizing all Corporation expenditures, and making final decisions in internal matters not resolved by the other officers. The President may appoint committees for a period of up to one year. Standing Committees shall require the approval of the Board of Directors.

B. The Executive Vice President shall act as Chairman Ex Officio of all Committees. He shall receive and coordinate reports which the Committees may generate. He shall facilitate communications between Liaison Officers and the Corporation. He shall act in the place of the President in his absence.

C. The Vice President - Engineering shall be responsible for managing and coordinating the activities of the technical staff.

D. The Vice President - Operations shall be responsible for the internal administrative functions of the Corporation, and for coordinating the use of the services provided by the Corporation.

E. The Secretary shall be responsible for maintaining active communication with the Members and others who may be interested in the activites of the Corporation, and shall maintain records of the Corporation's activities and minutes of the meetings.

F. The Treasurer shall be responsible for accounting for all revenues and expenditures, collecting all dues, serving notices of renewal, developing the yearly budget, preparing a financial report to be included in the Annual Report and such other interim financial reports as may be required by the Board of Directors.

He shall be responsible for assuring that an annual audit is performed by person(s) designated by the Board of Directors.

Section 6

The President may appoint Liaison officers, Consultants and such other appointed officials as the Board of Directors deems necessary and for the period deemed necessary.

Section 7

Vacancies in office:

A. The resignation of an Officer or Director shall be submitted at least one month before the effective date.

B. In event of resignation or demise of the President, the Executive Vice President shall assume the office of President until the next annual election of Officers.

C. In event of a vacancy in the office of any elected Corporate Officer other than the President as a result of the resignation or demise of such officer, the Board of Directors shall elect a temporary officer to fill the vacancy until the next annual meeting.

D. In event of resignation or demise of a member of the Board of Directors the position shall be filled until the next annual election by an alternate selected in the manner specified in Article V, Section 4.

Section 8

A Director may be suspended by presentation to the Secretary of a petition signed by ten percent of the Membership. Upon receipt of this petition, a special election shall be called by the Secretary or another Corporate Officer acting for him. This election shall take place at a special meeting of the Corporation which shall be held within sixty days from receipt of the petition.

ARTICLE V - "MEETINGS"

Section 1

An annual meeting of the Corporation shall be held between September 1 and December 31 of each year. The Membership shall be given not less than thirty days written notice of the date and place of the meeting. At this meeting the Officers shall present an annual report and the election of Directors shall take place.

Section 2

Written nominations of candidates who have agreed to serve if elected to the Board shall be submitted to the Secretary by an authorized Officer of the Member Society by a date specified in advance of the annual meeting. A candidate may also be nominated by five regular Members.

Section 3

At the annual meeting votes for directors shall be counted. A mail ballot shall accompany the meeting notice. Voting shall be conducted by secret mail ballot in a fair and democratic manner, and ballots must be received prior to the close of the annual meeting.

Section 4

The three or four Members receiving the largest number of votes shall be declared elected to the Board of Directors. The two nominees receiving the next largest number of votes shall be named first and second alternate.

Section 5

A simple majority of the Board of Directors shall constitute a quorum.

Section 6

The Presiding Officer may invoke Roberts Rules of Order in case of parliamentary question.

Section 7

The Board of Directors shall meet after the annual meeting but prior to January 1 for the purpose of electing Officers. Additional meetings of the Board of Directors shall be held as deemed necessary by the Board.

ARTICLE VI - "POLICY AS TO INVENTIONS AND PATENTS"

Section 1

In the event that a Member of the Corporation, either solely or jointly with others, makes an invention, whether or not patentable, relating to the work of the Corporation, then the obligation of such Member to his regular

employer shall take precedence and all rights in such invention shall be disposed of in accordance with the requirements of such regular employer.

Section 2

In the case of an invention in which the regular employer has no rights as determined by the employer and employee, the inventor may, if he wishes, disclose the invention to the Corporation in such form as it may designate, and may grant to the Corporation any rights in such invention which he may feel appropriate.

ARTICLE VII - "ADOPTION OF THE BYLAWS"

The Bylaws of the Corporation shall be adopted upon affirmative vote by a simple majority of the Members present at a regular meeting. For this purpose only, a Member is defined as a person who has submitted a completed application form.

ARTICLE VIII - "AMENDING THE BYLAWS"

Changes in the Bylaws of the Corporation shall require approval of two-thirds or more of the Directors. Notice of an amendment which has received such approval shall be circulated to the Members of the Corporation. The amendment shall take effect thirty days after mailing of said notice, unless written objection is received from at least ten percent of the Membership. In that case a mail vote shall be taken. Approval of the amendment shall then require a simple majority of those Members responding.

BYLAWS APPROVED: May 8, 1969

REVISED: Nov. 12, 1969 (Art. IV, Sect. 5, ¶F, concerning audits, and deletion of Art. IV, Sect. 9).

REVISED: Dec. 15, 1970 (Art. II, Sect. 2b and 3, and Art. 5, Sect. 2, concerning change of "Member Club" to "Member Society").

REVISED: Nov. 1972 (Art. V, Sect. 1, 2, 3 and 7, concerning changes in voting procedures and meeting dates).

REVISED: Dec. 17, 1972 (Art. IV, Sect. 4, concerning provisions for the election of additional officers).

REVISED: Oct. 15, 1978 (Art. V, Sect. 2, nomination of candidates to the Board).

(Printed Mar. 1979)

OSCAR SATELLITE INFORMATION SUMMARY

(Northern Hemisphere)

MODE	UPLINK			DOWNLINK			BEACON		DOWNLINK OFFSET-kHz
	Freq.	Polar.	Mod.	Freq.	Polar.	Mod.	Freq.	Polar.	
7A	145.85 -145.95	LHC	USB	29.4-29.5	L	USB	29.502	L	-
B	432.125-432.175	RHC	USB	145.975-145.925	RHC	LSB	145.972	RHC	-
8A	145.85-145.95	LHC	USB	29.4-29.5	L	USB	29.402	L	-8
J	145.9-146.0	RHC	USB	435.1-435.2	L	LSB	435.095	L	-6
RS	145.88-145.92		USB	29.36-29.40		USB	29.401		

CQ OSCAR DE 4U1UN

By Ray Soifer, W2RS
60 Waldron Ave.
Glen Rock, N.J. 07452

On February 4, 1978, club station 4U1UN, located at United Nations Headquarters in New York City, became a new country on the DXCC Countries List. The UN is understandably concerned about maintaining tight security precautions, so most 4U1UN operation to date has consisted of brief lunch-hour forays by staff members. However, special arrangements have been made for full-time operation of the station during several major DX contests, and it was with this in mind that the North Jersey DX Association accepted an invitation to operate 4U1UN during the 1978 CQ World Wide CW Contest, on November 25-26. The principal objective was to give a new country on CW to as many DXers as possible.

The invitation came about a week before the contest. With a little gleam in his eye, the writer signed on to take the last shift, Sunday from 1700 UTC through the end of the contest at 2400. My operating partner was to be Dave Beckwith, W2QM, a top-notch operator and DXer but one whom the satellite bug has not yet bit. (Are there any left?) Fortunately, however, Dave is a very tolerant soul, and I started to wonder...might there be any way to get the new country on OSCAR while we were there?

Owing to security restrictions, all operation would have to take place from within the temporary contest operating room, with a UN staff member in attendance who would be responsible to the authorities. There was concern about possible RFI into the UN police radio, which had apparently occurred once before and caused an early QRT. Fortunately, the cause of that episode had been discovered and corrected, but nobody wanted a repetition.

Physically, the operating room was located in a penthouse atop the 39th-story roof of the Secretariat Building. We were informed that the doors to the roof were equipped with alarm devices, and that triggering them would be most unwise. The penthouse itself was about ten feet high and seemed to be made of concrete. It had small windows beginning about eight feet from the floor, looking east and west. From this description, provided by the crew who had operated the phone contest the previous month, it appeared that any OSCAR operation would have to use an indoor two-meter antenna, since the only outdoor antenna available was an 80-10 meter trap dipole which could be used for 10-meter downlink. Using the FT-221 multimode two-meter transceiver at 4U1UN, the phone crew had maintained fair contact with the North Jersey DX Association repeater, with only a 19-inch whip antenna. Thus, an indoor antenna for OSCAR did not seem out of the question.

Plans were made to bring a portable two-meter dipole and hang it in a window. When this was discussed over the repeater, Leo, W2OEH, volunteered his collapsible two-element beam. Ed, WA2CBB, who was going over to 4U1UN Friday night, volunteered to leave a 50-watt amplifier. Suddenly, things looked a bit brighter. In addition to the contest-type things (keyer, audio filter, etc.), the writer hooked up a 9-volt battery to a Janel preamp in case the FT-101 at 4U1UN needed some help on the downlink.

Friday night at home: A single ring on the telephone, the signal to get on the repeater. Ben, W2BXA, had WA2CBB's wife on the telephone. Ed reported that the FT-221 was not there. Should he leave the amplifier anyway? No, I said, I would bring my trusty old Ameco TX-62, along with an FM hand-held to provide liaison.

Saturday, Joe, W2YY, on the next shift, set up a broom handle in a pipe stanchion to serve as a mast for the two-meter beam. W2QM, my operating partner, who lives near W2OEH, picked up the beam and would bring it with him. I sat down and plotted orbits. Two AO-7 orbits, 18444 and 18445, and one AO-8 orbit 3715, looked possible during the time available, providing of course that they came up in Mode A.

Sunday. Dave and I arrived at 4U1UN, amid a few misgivings about how we were going to get our equipment back out through security. After figuring out how to get a sidetone for keying (the one in the FT-101 wasn't working), we settled down to the pileup. With Dave giving out 59905 reports, (if you got anything else you worked a pirate), I went about setting up the FM link. Trouble. The one-watt hand-held, even with the beam, would not key the repeater. We could hear it, but could not

get in. More trouble. In the rush to get going, good old W2 Real Slow had left the OSCAR tracking data home. Still more trouble. The telephone would not dial out on Sundays. Well, we had a radio station going, so I told Dave that the next time he heard an NJDXA member I wanted to talk to him. Sure enough, Hans, W2TO called on 10 meters and Dave passed the key to me. After I explained the problem, Hans got W2BXA on the repeater, and Ben read the tracking data to me on FM while I responded on 28 MHz CW.

At this point, Mr. Ormond Abbott of the UN staff arrived, to be joined later by Max De Henseler, HB9RS/W2, the president of 4U1UN. Were it not for these fine gentlemen, nobody would have worked 4U1UN on OSCAR at all that day. I quickly explained what we wanted to do, and the fact that I was afraid that absorption in the building walls would prevent the OSCAR signal from getting out. Later, Dave found that if he placed the two-meter beam up against the window, we could get into the repeater, but not otherwise. Thus, as long as we were restricted to indoor antennas, we would probably not be able to rotate the beam. Ormond and Max had a solution. On the way in, they had noticed that one of the roof doors was open, and Ormond, who had been with the UN since 1945 and knew absolutely everyone in the place, simply called the security officer in charge and obtained permission for us to use the 39th floor roof, as long as he was there.

Walking outside, we found that building absorption had indeed been the problem; the hand-held was full quieting into the repeater from the roof on its internal whip. We set up the broomstick mast in the pipe stanchion, placed the stanchion on a stool, and the stool on the roof. Presto. Two elements up 400 feet. We were not entirely in the clear in all directions, however, since the penthouse still blocked the west and a high building wall blocked the north. With only 25 feet of coax (enough for the indoor operation that had been contemplated), that was about the best site we could find.

Via the repeater, Jack, W3CWG reported that Orbit 18443 had stayed in Mode B. With the contest going well at better than 100 contacts per hour, we decided to forego 18444, since that would probably be in Mode B as well. (It was.) Using the outdoor beam, the TX-62 was 599 at W2YY, W2BXA and WA2CBB. With Orbit 18445 coming up, I explained the pointing instructions to Ormond, who had volunteered to be our "Armstrong" rotator, and hooked up the preamp to the FT-101. Murphy's Law. No preamp. No OSCAR either, and we wondered what was going on until W2BXA said via the repeater, which we could still hear, but not talk into from the operating position, that this orbit was in Mode B also. The JA's were beginning to run on 14 MHz, and we went back to that band, knowing that few Japanese had yet worked 4U1UN for a new country on any band. The next orbit, 3715 on OSCAR 8 would tell the story. Via hand-held from the cold roof, we mentioned to Ben that if that orbit was in the wrong mode as well, the gang on 3850 KHz would get a lot of hot gas from us.

Half an hour (and fifty JA's) later, we said sayonara on twenty and set up for OSCAR 8. Mode J! Stay cool, said the gang on the repeater. Well, we weren't going anywhere, and it was minus ten degrees Centigrade on that roof. At 0109 UTC, eleven minutes after equator crossing, the satellite flipped to Mode A. "We hear you on 29.468!" said WA2CBB on FM. Apart from the beacon, the first signal we heard was W2BXA. QSO. Then W2LV, for his Country Number 96. W1NU for his Number 99. WA2CBB, for Number 87. All told, we worked eight stations in five minutes before the satellite slipped below the northern wall. After that, we could still hear it but could no longer access it.

As is apparent from this account, 4U1UN via satellite was a collective effort gotten up at the last minute by quite a few wonderful people. This particular nut held the key paddle, but if any of the people mentioned, plus a number of others, had not been there, it could not have come off. In particular, special thanks to K2FC and W2TO for arranging the contest operation. Thank you all, and we'll be back to give 4U1UN contacts to more of those who need it. That is, if the security force lets us back on the roof!

CORRECTION

K4OQ brought a typo error to my attention about my antenna switch for phase control on page 9 of the December 1978 Newsletter.

The written text and description of the diagram is correct. The error is in the diagram. Length A to B in the diagram is incorrectly given as RG-58/U coax. Please note that length A to B must be RG-59/U as correctly given in the text.

Thank you, Joe, and to Bob, K4OQ for pointing the error out. I hope others will find this circuit as much help as I have. Ross, WB6GFJ

CONDUCTING AN OSCAR PRESENTATION

By Bud Schultz, W6CG

Here are some thoughts and suggestions for a speaker who may have the opportunity of giving a talk to an amateur radio group on the subject of "getting acquainted with OSCAR". This material is based on my personal observations gathered during numerous speaking engagements over the past five years.

1. The speaker's opening approach is very important, because if you fail to gain a good rapport with the audience in the first few minutes, it may be difficult to "hold" them for the duration of the talk. Keep in mind that a group of radio amateurs represents a very wide range of ages, technical skills, and interests, so therefore you must tailor your talk to appeal to both the technical and the non-technical members of your audience. Sell the idea at the very start that one does not have to be a "space scientist" to participate in the satellite facet of amateur radio. Don't talk "down" to the group, but rather be somewhat informal because many hams seem to have an "awe" of space communications under the misapprehension that it is beyond their ability to understand.

2. Prepare and follow an outline for your presentation using the K2OVS booklet (AMSAT reprint), Dunkerley's article in the AIEE Journal or K3RXK's Popular Mechanics story on OSCAR (AMSAT reprint). Be sure to point out how a transponder differs from a repeater. Surprisingly many uninformed amateurs have the notion that OSCAR is nothing more than an FM repeater flying around in space!

3. Emphasize the fact that very simple equipment and antennas will allow a reasonable access to OSCAR communications. Specific suggestions of practical gear such as the Ameco TX-62, Gonset Communicator II, a modified GE Progress Line, etc.often encourage the beginner. Throughout your presentation, try to present the subject from a practical user standpoint by explaining how a beginner can get started on OSCAR. It's not necessary to go into the technical details of satellite design or theory of communications links to present the subject in terms that a beginner can relate to.

4. Be sure to display actual material such as the W6PAJ Calender, the W2GFF or Satellabe plotters. Remind them that the ARRL publishes "Getting to Know OSCAR" which contains a simple orbital plotter which will be quite satisfactory for beginners. These things all help to spark interest in the listener who is still not quite sure he or she wants to try this new frontier of hamming.

5. Use a small amount of amateur satellite history, pointing out the cost of OSCAR I ($63) through Phase III and its cost of $250,000 (?). This is a good spot to encourage membership in AMSAT and ARRL. Point out this insures continued satellite activity and explain that contributions are tax deductible. (This may appear to be trivial but experience shows it has affected some decisions to contribute.) It is important to point up the voluntary nature of our financial support. Don't forget to plug the "economy" of a Life Membership and mention the Solar Cell Program. It is important to sign up prospective members "on the spot". Have them fill out a membership application and give you their dues payment after the meeting. Then be sure to forward everything immediately to AMSAT-Headquarters in Washington. We find much worse returns when club members take the application forms home with them.

6. Be prepared to come up with actual orbital times and equator crossings for the days immediately following the talk. This is the most common question you will be asked following an OSCAR presentation. If a ham can go home, turn on his or her receiver and hear an OSCAR orbit for the first time, you have gone a long way in lining up a new supporter!

7. If a tape or cassette player is available, it is a very effective "gimmick" to include an actual demonstration of a good OSCAR orbit. Hopefully, try to include a little DX if possible. It is a good practice to include on the demo tape a transmission from your own station saluting the particular club or group in question, "This is W6CG greeting the California Amateur Radio Club on orbit 4687 - using a power of 20 watts DC input". This is a real attention getter to those who have never heard the satellites. In one instance, the program was opened with a tape greeting through an AMSAT OSCAR 7 orbit, and it proved extremely effective in holding the attention of everyone for the entire presentation.

8. In almost every meeting, there will be educators of one level or another. They should be made aware of the availability of the ARRL Educational Program material and how to obtain it. It is important to touch on the educational and medical uses that have been part of the satellite experimental surveys. This further justifies our use of certain portions of the spectrum and our requests

for cooperation from amateurs using other modes during the passing of a satellite orbit.

9. Have AMSAT and ARRL printouts organized to pass out at the close of the meeting. (Include membership applications in a prominent spot.) Show copies of the AMSAT Newsletter that is part of the benefits of membership. The ARRL Club and Training Department has a slide and cassette presentation on OSCAR 8 which is available on request. It is nicely coordinated and requires about 15 minutes. It can be a worthwhile adjunct to your talk but does require the availability of a 35mm slide projector and a tape cassette player. Slide sets are also available from Dr. Norm Chalfin, K6PGX, Box 463, Pasadena, CA 91102.

10. Do not attempt to answer questions during the talk, but rather handle these at the conclusion. Nothing can break up the continuity of your presentation as quickly as this does. You will tend to lose the attention of many in the audience if you attempt to explain certain points to individuals.

11. Finally - Don't "overtrain!" Before preparing for the meeting, find out from the person in charge just how much time they wish to make available. Study your listeners. You can often tell when it's time to wind down! Always quit while you're ahead. Remember, the main thrust of the presentation is to acquaint hams with satellite operations, but secondly it is very important to recruit new members for AMSAT and the ARRL because members are the main sources of our support.

DJ4ZC (left), W3IWI, W0PN and VE3SAT taking a break after a heated discussion about the software being designed for the Phase III spacecraft, at a recent experimenter's meeting.

photo G3ZCZ

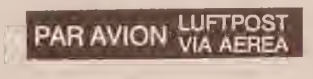
Letter and Comment

Dear Joe:

I would like to make a correction to the minutes of AMSAT Annual Meeting on Oct. 14, 1978, published in the Newsletter No. 4 Dec. 1978 Vol. X.

On page 19 paragraph 8 it states: "K2ZRO discussed briefly problems with the AMSAT QSL Bureau..." I would like to stress that at no time did I criticize the operation or implied inadequacy of the Bureau! On the contrary. I'm very much impressed by the unselfish job Ross, WB6GFJ is doing for us. My complaint was that so few OSCAR users take advantage of this fine service. My own experience, supplemented by polling several participants of the Annual Meeting, indicated relatively poor QSL returns via the Bureau. The problem lies not with the Bureau but with the lack of envelopes on file from OSCAR users. (Or a reluctance of some individuals to use the Bureau.) My proposal was to subsidize "one-shot" mailing to the "delinquents";funding by voluntary contributions of the users of the Bureau. Such a mailing with an enclosed "blurb" on the operation of the Bureau could have a stimulating effect on those who either don't use the Bureau at all or are delinquent in mailing their SASE.

I'm personally willing to address the envelopes to those that have cards in the Bureau and don't maintain envelopes on file.



73,

Kaz Deskur, K2ZRO

P.S. I would also like to make a strong appeal to OSCAR users to take advantage of the service provided by the Bureau. With ever increasing cost of postal service, the Bureau is a bargain. By filing your envelopes with the Bureau you not only save your money but particularly of those that are trying to send their OSL's to YOU. Did you think of that? Do the other fellow a favor--send your SASE to the AMSAT QSL Bureau!

Dear Joe:

Like many amateurs, I have a good deal of noise from all different sources. My rig for 10 meters is a KWM-2A with the Collins Noise Blanker 136B-2, and Vertical antenna.

A number of other KWM-2 owners expressed their dissatisfaction with the Collins blanker saying it did not reduce noise at all. While I noticed the same problem, I felt the problem was in my method, not the product. Today is my red letter day for I solved the problem.

To get the 136B-2 Noise Blanker to work properly, you need to have the noise blanker antenna tuned exactly for 40 MHz. It is unfortunate the 136B-2 Manual does not stress this point enough.

I have a simple vertical antenna made from an SO-239 coax connector, 3 radials and a vertical element. The radials and the element are made from ordinary zip cord. Using a Grid-dip oscillator, I tuned the antenna for 40 MHz. Results are very impressive. Using the variable noise blanking control, I am now able to reduce bothersome line noise of S-1 to absolutely nothing. Stronger noise can be reduced to close to nothing. Thanks to careful tuning of the noise blanker antenna, the unit functions properly and has increased my ability to copy weak Mode A passes.

For anyone having problems with their Collins Noise Blankers, give this a try. The effort will reward you with excellent results.

73,

Ross Forbes, WB6GFJ

Gentlemen:

I must echo to some extent the remarks about having a southern control station to keep us from having a washout orbit merely because our control is in Canada. I certainly do not wish to suggest that it be replaced, merely augmented.

I think that the problem of high power use could be stopped very quickly but we all of us are going to have to realign our thinking. Here is how to do it: Have everyone who receives an offending operator send along the call, date, orbit, etc. After gathering these reports, compile them and when one operator has been reported enough times, publish the name and call and give him the silent treatment.

I feel that the experiment day per week is foolish. I echo K4KQ who wants to know who, what, when and what for. The birds just are not that crowded that we need to shut out the bird for one seventh of the time. All in all, I feel that you have reacted in a most irresponsible manner and that this built-in day off deal should be rescinded.

The statement that the receiving system for the Phase III deal cannot be changed. I just can't accept that. I think a simple AVC could be put in the receiver and all power buffs would be shut down, every time they tried to "DX" at the expense of the rest of us.

I just can't see putting the bird on 1296 for some time. What do you think we have out here, an unlimited supply of money for antennas, preamps and transceivers? Someone says the 432 MHz antennae will show no gain on 435? Why was 435 used for OSCAR 8 Mode J? What was wrong with Mode J being 432? One more thing, why the polarization reversal on 2 meters? This alone costs amateurs a bundle of money. I have tried everything to make it switchable and end up with SWR you wouldn't believe.

All in all, I intend to continue to support AMSAT but I am not exactly delighted with a lot of the decisions that have been made. I want to stay with it, but I think that people like me out here are not being properly considered in your decisions.

I want to thank all of you that are doing so much, some at a great hardship (we all go through this in our lifetimes.) I want to continue with AMSAT but right now I have lots of gear that is not worth much and it looks as though you are going to continue to build gear that is going to move me right out of the ball park.

Let's get to basics and build a satellite that is good, reliable and uses frequencies that we all have. Don't try to be all things to all people. Next, it will be chess by satellite! I personally think OSCAR 8 is a disgrace even though you are putting out the junk about how wonderful it is.

73's

W9JI

Dear Joe,

Thanks for giving me this opportunity to try to reply, at least in brief, to the comments of W9JI and others. First, W9JI asked about southern telecommand stations. There have been no southern telecommand stations largely because fewer passes of each satellite are seen at low latitudes, while northern stations such as our stations in Canada and England see a portion of nearly every pass should commanding be required. Looked at another way, it would take ten command stations located near the equator to do the job of two stations located near the poles.

The complaints of satellite "abusers" is one that we are repeatedly hearing, and we are studying the problem. We walk a narrow line between allowing unrestricted, free use of the satellites and appearing to be "police". We are looking at enforcement methods such as appointing "official observers," procedural solutions such as "boycotting" of offenders, and technical solutions, e.g., adaptive transponder notch filters that would null out excessively strong stations appearing in the passband.

The "experiments day", while it may not be fully used, serves as an incentive to encourage innovative users of the satellites. Unless regular time slots (e.g., Wednesdays) are reserved, it would be very difficult to "clear the satellite" on the occasions when we may need it for single experiment exclusive use. Please, don't play down the importance of satellite experiments; our justification to governments for launches and for frequency allocations are based more on experimental and public service applications than on run-of-the-mill satellite QSO's.

The increasing congestion of the two and ten meter bands due to terrestrial (non-satellite) amateur use is forcing us to think in terms of going to higher frequencies such as the 435, 1250 and 2390 MHz bands. One need only listen to the 29.35 - 29.50 MHz segment on a day when ten meters is open to hear the problems of QRM from terrestrial use of these frequencies, and QRM from FM amateurs is a serious problem in the 145.8-146.0 MHz region in many parts of the world. We need to go to higher frequencies in order to grow and expand. As it is, we must confine new

operation on 70 centimeters to the 435 MHz amateur satellite segment approved at the 1971 ITU World Administrative Radio Conference on Satellite Telecommunications. 432 MHz is no longer available as an allocation for future satellites. To answer the question about the different sense of circular polarization needed for operation with Mode A vs. Mode B or Mode A vs. Mode J. the hybrids used with AMSAT-OSCAR 7 and 8's antennas to develop circular polarization have two input ports for the two onboard transponders and the two ports inherently have reversed senses of circular polarization.

Perry Klein W3PK
LM-1

Ben W2BXA (left), and Bob W2LV (right), holders of the first two DXCC certificates for working 100 countries via OSCAR. Vic, W1NU holds certificate No. 3.

Dear Joe,

Stop me if you have heard this suggestion before, but just in case you have not -

Has anyone asked NASA about the possibility of a 2m portable rig aboard the Space Shuttle?

Aside from the sheer fun of just talking to a ham in space, I believe the impact might be tremendous, if say priority could be given to contacts with Third World Stations.

Yours Faithfully,

John Branegan, GM8OXQ

Dear Joe,

The 2-metre segment 145.8 to 146 has just been released for Malaysian amateurs (until now, only one spot frequency was available), and we are busy writing articles on satellite communication in the society's newsletter. More than 100 QSOs have been logged at 9M2CR so far on Mode A and Mode J. "Neighbouring" stations are thin on the ground and may be counted on the fingers of one hand: WB5LBJ/DU6, KA6RB, DU6EG, YBØAT. But that's partly due to the penalty of being surrounded by a lot of ocean! Trickiest feat has been to sustain successful 3-way QSOs between WB5LBJ/DU6, KA6RB and 9M2CR: this demands a pre-arranged 1-2-3 order for passing on the next transmission, and some juggling with differing Doppler shifts.

And that's a subject on which very little appears to have been written for struggling amateurs. Wouldn't it be possible for the AMSAT Newsletter to publish some families of curves of Doppler Shift against time in minutes from AOS through TCA to LOS at distances of n x 555 km from the sub-satellite point (this would usefully transform to 5 degree longitude intervals for those of us who live on the equator!). For a start, let us have them for OSCAR 8 - Mode A and Mode J. And how about some advice on basic QSO drills? Should we leave the uplink frequency strictly alone and scramble around for our own downlink and the other fellow calling? Of course, it is comforting to hear one's own downlink during a QSO, yet shifting the uplink frequency to get approximate convergence with the other station's signal is bound to bother him. This is no great problem in these sparsely-populated areas. But it must surely be a topic of real importance in crowded lands. And, talking of basic drills, I've yet to see any book or leaflet tell beginners that they must use headphones if they are to avoid howling "round the loop" on SSB.

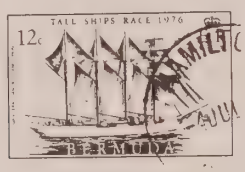
A final observation: the band-plan makes real sense, and we try to encourage observance in this region. But that small segment for RTTY? Why? At 9M2CR we are almost exclusively on RTTY at HF and we are eager to champion the mode. But to grapple with Doppler shift on RTTY defies the imagination. Granted, we have been able to print out OSCAR 7's "space-only" RTTY telemetry in earlier days-but only by dint of continuous hair-line tuning adjustment throughout the pass. You may struggle through an SSB QSO with a plus-or-minus 200 Hz margin, and on CW with much more: but not on RTTY. What's more, an RTTY signal is surely unacceptable through the transponder, since it is 100% duty cycle on FSK.

Of course, on Phase III, Doppler shift may be more manageable. So why not leave RTTY in the bandplan, but stipulate "space only" transmissions. And how about some pre-launch advice on what to expect on Phase III - at least in terms of Doppler and recommended QSO drill?

Best 73,

Colin Richards, 9M2CR
AMSAT LM-714

(I remember sending RTTY through OSCAR 6. Doppler was not a problem if narrow filters were not used (ST-5 TU), however with Phase III, there should be no problem with Doppler. I recommend adjusting your uplink to keep the downlink apparently fixed. Then all stations in QSO will have good copy ----Joe).



Dear OM:

I would like to add my voice to those already counted in your Newsletter concerning the problem of high power stations. I don't know what is worse, to have the entire transponder turn off, as with the RS craft when overpowered, or to struggle through a pass, never getting a good return long enough for a QSO, while a high-power station monopolizes OSCAR 8. At least with RS, I don't waste my time and experience with the frustration of a bad pass!

I cannot believe that with the pool of technical help available for the OSCAR program that a good solution to the high-power problem cannot be worked out. Many suggestions have been made some of which even I could design with my non-technical background, such as clipping or hard limiting circuits. I would prefer a selective circuit, such as clipping or selective channel blocking that would effect the guilty station and not the rest of the band.

I have addressed similar comments to RS3A along with my telemetry report, and hope they can work on a good solution.

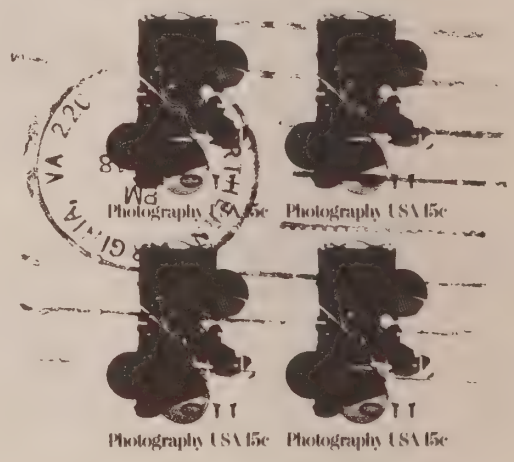
Another point of frustration has been the QRM on the passband frequencies. When the band is open and the 10 meter downlink weak, SSB ragchewers have made many passes impossible. I suggest the vast majority are not aware of what they are doing. I even heard one WA1 comment to another W1 not to worry about the frequency as he knew when the passes were! At that time his wide SSB signal kept me from completing a QSO on an overhead pass here.

I believe a continual educational & reminder program is needed so other hams who are not aware of the satellite subbands can become aware, through the other ham magazines, newsletters and and other media that can be used.

As for the "Is this the future?" article, count me among those who do not want to see satellite operation become as thrilling as two-meter FM! I may become frustrated now, but I'm still in there trying, and I am planning improvements for the future. Meanwhile my two-meter FM rig is gathering dust.

Also, I enjoy the AMSAT Newsletter very much. It is good both for the information it carries, and also is a morale-booster as I realize my problems and frustrations are shared by others.

Best 73,
Howard Sodja, W6SHP



MODE J CLUB

Got your Mode J Club membership number yet? The new Mode J Club was announced in January "QST", and certificates, endorsement stickers and Mode J Club newsletters are now available.

To become a member of the Mode J club, first complete eight OSCAR 8 Mode J contacts. QSL cards are not required. Just list the call sign of each station worked along with the date, orbit number and station equipment used. Send this information, along with $3 in U.S. funds (a one-time charge to cover cost of the certificate and newsletter) to Mode J Club, c/o Larry Roberts, W9MXC, AMSAT Area Coordinator, 3300 Fernwood, Alton, IL 62002. A large "8½x11", beautiful, four-color certificate, serially numbered, will be sent in reply. If you also include a self-addressed, stamped envelope, W9MXC will send you the Mode J Club newsletter. This publication will try to keep you up-to-date on Mode J satellite activities.

Mode J Club numbers are assigned to the operator similarly to the AMSAT membership number, so if you give a demonstration or use another call sign other than your own, you may still exchange your J number. Once you receive the certificate with your Mode J number, exchange it on the air with other members to qualify for endorsement stickers of 50, 100, 250, 500 and 1,000 contacts. To receive endorsement stickers you need to exchange your Mode J member number over the air with other Mode J Club members. (Be sure to get their Mode J member number as this is how you receive points.) When you have acquired enough for the first endorsement of 50 different Mode J member numbers, follow the same procedure as for initial membership by listing each Mode J number, call of station worked, date, and orbit number. Arrange the Mode J numbers in numerical order (e.g., 7, 14, 25, etc.) Include with your list 25 cents to cover the cost of each endorsement sticker for which you qualify.

In addition to the contact stickers, a special sticker will be awarded to those who give a public demonstration using OSCAR 8 Mode J. For this demonstration sticker, list all details of the event, including equipment used.

To receive the Mode J newsletter, please maintain SASE's on file with W9MXC. Hopefully, Mode J Club newsletters will be sent out once a month. Please send W9MXC any news items, e.g., changes in station equipment, demonstrations, new projects, circuits, etc., as others may be interested in hearing of your activities.

Mode J Club Certificate Number 50, awarded to AMSAT on March 5, 1979, on the occasion of OSCAR 8's first birthday.

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AMSAT-Deutschland	c/o A. Schoening, DC7AS, Ludolfingerweg 50/52 D-1000 Berlin 28, (030)401-4411
AMSAT-France	c/o Gerard Francon, F6BEG, 2 rue du Guercy, 15000 Aurillac
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Illinois (Northern)	Joe Schroeder, W9JUV, Box 406, Glenview, Illinois 60025 (312)724-8816
(Southern)	Larry H. Roberts, W9MXC, 3300 Fernwood, Alton, Illinois 62002 (618)465-2735 (314)232-4095 (day)
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New Jersey (Southern)	William C. Luebkemann, WB2LCC, 7116 County Farms Road, Marlton, New Jersey 08053 (609)877-1776
New York (Western)	Bob Crumrine, WB2DNN, 228 West Elm Street, E. Rochester New York 14445 (716)385-2416

(Eastern)	Fred Merry, W2GN, 35 Highland Drive, East Greenbush, New York 12061 (518)477-4990
(Central)	Kaz Deskur, K2ZRO, Box 11, Endicott, New York 13760 (607)748-8028
Nevada	Volunteer needed
New Mexico	Volunteer needed
North Carolina	Jim Stewart, WA4MVI, Rt. 8, Box 92, Hendersonville, North Carolina 28739 (704)684-2090
North Dakota	Charles T. Storm, WBØJLP, Box 573, Langdon, North Dakota 58249 (701)256-2562
Ohio	Richard Drain, WA8YFW, 6730 Alter, Dayton, Ohio 45424 (513)233-8055
Oklahoma	Bob McArthur, WB5MSU, Box 694, Grove, Oklahoma 74344 (918)786-3235
Oregon	Dave Leonard, WA7VKC, 1980 Hillcrest, West Linn, Oregon 97068 (503)636-2379
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	Dr. Stephen Cruse, K3WHC, 1018 North George Street, York, Pennsylvania 17404 (717)848-1302
Rhode Island	George Simmons, N1RI, 46 Broad Street, Warren, Rhode Island 02885 (401)245-4075
South Carolina	Volunteer needed
South Dakota	Stan Burghardt, WØIT, Box 73, Watertown, South Dakota 57201 (605)886-7314
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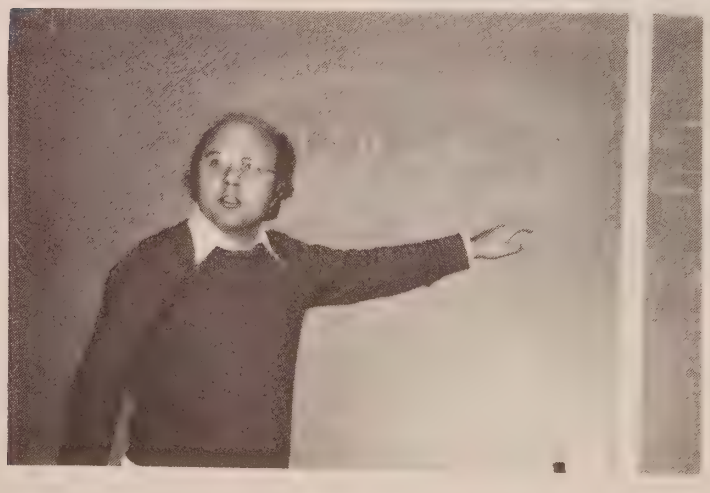
(Southern)	Charles O. Webb, WB5UER, 1627 W. 5th Street, Freeport, Texas 77541 (713)233-5106
Utah	Volunteer needed
Vermont	Stephen Warley, K1LJL, 63 Moore Drive, Burlington, Vermont 05401 (802)658-3679
Virginia	Ted Mathewson, W4FJ, 1525 Sunset Lane, Richmond, Virginia 23221 (804)355-5118
Washington	Volunteer needed
West Virginia	Clark Stewart, W8TN, 104 Henrietta Street, Ravenswood, West Virginia 26164 (304)273-4680
Wisconsin	Ben Wright, K9DID, 1024 Whittier Drive, Appleton, Wisconsin 54911 (414)739-8958
Wyoming	Paul Humberson, WA7DKZ, 508 Clark, Laramie, Wyoming 82070 (307)745-3193

AMSAT NETS

The following AMSAT Nets meet weekly to disseminate information to newcomers and to keep regular satellite users in communication with one another.

NET	Day	Time	Freq.	Mode	Net Control
United States					
East Coast	Wed.	0100 UTC	3850 kHz	LSB	WA3NAN
Midcontinent	Wed.	0200 UTC	3850 kHz	LSB	WØCY
West Coast	Wed.	0300 UTC	3850 kHz	LSB	W6DOW
Japan					
JA	Mon.	1400 UTC	3555 kHz	LSB	JA1VDV et al
Kanto-Tokyo	Mon.	1300 UTC	144.30 MHz	USB	JR1HAL
Nagoya City	Sat.	1230 UTC	144.29 MHz	USB	JA2ORW
Chugoku	Sun.	1300 UTC	144.20 MHz	USB	JA4CMJ
Shin-etsu	Sun.	1230 UTC	144.40 MHz	USB	JAØBBW
Kanto-Tokyo	Mon.	1320 UTC	430.25 MHz	USB	JA1JHF
Asia-Pacific	Sun.	1100 UTC	14,280 kHz	USB	JA1ANG et al
Western Europe	Sun.	1015 Local	3780 kHz	LSB	G3RWL
International	Sun.	1800 UTC	14,280 kHz	USB	WA3NAN
	Sun.	1900 UTC	21,280 kHz	USB	WA3NAN
European	Sun.	2000 UTC	3680 kHz	LSB	G3MQD
Spanish Language	Sun.	2200 UTC	14,120 kHz	USB	ZB2BL
United Kingdom					
London	Sun.	1930 Local	144.28 MHz	USB	G8CSI
Norwich	Sun.	1130 Local	144.28 MHz	USB	G8IFF
Cardiff	Sun.	1930 Local	144.28 MHz	USB	GW3NJW

Bulletins of general interest to those interested in amateur satellites are now transmitted regularly on AMSAT-OSCAR 7 and 8 reference orbits, a few minutes after equatorial crossing. These bulletins are transmitted on a downlink frequency of approximately 29.490, 145.960 and 435.150 MHz when the satellites are in Mode A, B and J respectively, and can be received over most of Eastern North America.

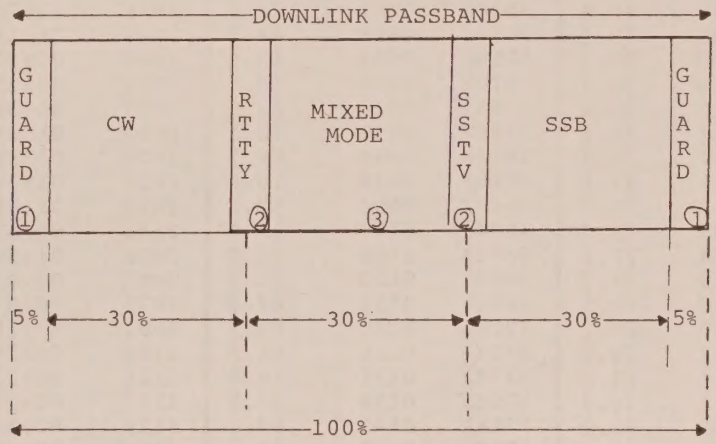


DJ4ZC explaining some of the Phase III design concepts to other members of the Phase III team at a recent experimenter's meeting in the Washington area.
photo G3ZCZ

THE AMSAT SATELLITE USERS BAND PLAN

This band plan allocates a percentage of the available radio frequency spectrum as seen on the downlink to different modes of communication. The relative amount of spectrum for each mode is thus the same for any transponder in any satellite.

The allocations are as follows:

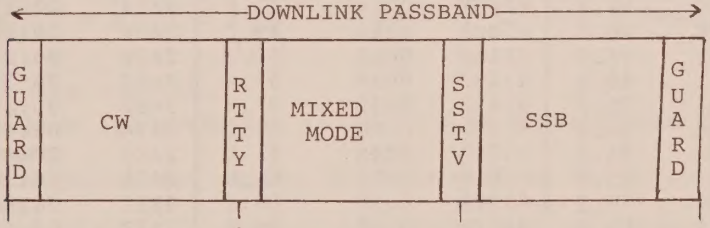


Notes: ① Guard Area to avoid interference to beacons. These frequencies are available for Emergency and Bulletin Stations.

② RTTY and SSTV are placed at the edge of the CW and SSB passbands, conforming to their usage at HF where RTTY is present within the CW space and SSTV is transmitted in the SSB subband.

③ Mixed Mode Area. This is recommended for crystal controlled stations, or by Dx-pedition stations, or anyone wishing to work both CW and SSB stations.

This band plan is always based on percentages of the downlink passband. It applies to both inverting and non-inverting transponders. The allocations of frequency for AMSAT-OSCARs 7 and 8 are as follows.



MODE A	29.4	29.435	29.465	29.5 MHz Guard Channels 5 kHz
MODE B	145.925	145.94	145.96	145.975 MHz Guard Channels 2.5 kHz
MODE J	435.1	435.135	435.165	435.2 MHz Guard Channels 5 kHz
RS	29.36	29.374	29.386	29.4 MHz Guard Channels 2 kHz

REFERENCE ORBITS 1979

DATE	OSCAR 7 Ref Orbit	OSCAR 7 Time (UTC)	OSCAR 7 Long °W	OSCAR 8 Ref Orbit	OSCAR 8 Time (UTC)	OSCAR 8 Long °W	RS-1 Ref Orbit	RS-1 Time (GMT)	RS-1 Long °W
2 Apr	20024	0119	82.0	5473A	0135	67.3	1888	00:52	126.2
3 Apr	20036	0018	66.9	5487A	0141	68.7	1900	00:57	128.9
4 Apr	20049X	0112	80.5	5500X	0002	44.2	1912	01:02	131.6
5 Apr	20061	0012	65.3	5514A	0008	45.5	1924	01:06	134.3
6 Apr	20074	0106	78.9	5528A	0013	46.8	1936	)1:11	137.0
7 Apr	20086	0005	63.8	5542J	0018	48.1	1948	01:16	139.8
8 Apr	20099	0100	77.3	5556J	0023	49.4	1960	01:20	142.5
9 Apr	20112qrp	0154	90.9	5570A	0028	50.7	1972	01:25	145.2
10 Apr	20124	0053	75.8	5584A	0034	52.0	1984	01:30	147.9
11 Apr	20137X	0148	89.4	5598X	0039	53.3	1996	01:34	150.6
12 Apr	20149	0047	74.2	5612A	0044	54.7	2008	01:39	153.4
13 Apr	20162	0141	87.8	5626A	0049	56.0	2020	01:44	156.1
14 Apr	20174	0041	72.7	5640J	0054	57.3	2032	01:48	158.8
15 Apr	20187	0135	86.2	5654J	0100	58.6	2044	01:53	161.5
16 Apr	20199qrp	0034	71.1	5668A	0105	59.9	2056	01:58	164.3
17 Apr	20212	0128	84.7	5682A	0110	61.2	2067	00:02	136.7
18 Apr	20224X	0028	69.5	5696X	0115	62.5	2079	00:07	139.5
19 Apr	20237	0122	83.1	5710A	0120	63.8	2091	00:11	142.2
20 Apr	20249	0021	68.0	5724A	0126	65.2	2103	00:16	144.9
21 Apr	20262	0116	81.6	5738J	0131	66.5	2115	00:21	147.6
22 Apr	20274	0015	66.4	5752J	0136	67.8	2127	00:25	150.4
23 Apr	20287qrp	0109	80.0	5766A	0141	69.1	2139	00:30	153.1
24 Apr	20299	0009	64.9	5779A	0003	44.6	2151	00:35	155.8
25 Apr	20312X	0103	78.4	5793X	0008	45.9	2163	00:39	158.5
26 Apr	20324	0002	63.3	5807A	0013	47.2	2175	00:44	161.2
27 Apr	20337	0057	76.9	5821A	0019	48.5	2187	00:49	164.0
28 Apr	20350	0151	90.5	5835J	0024	49.8	2199	00:53	166.7
29 Apr	20362	0050	75.3	5849J	0029	51.2	2211	00:58	169.4
30 Apr	20375qrp	0144	88.9	5863A	0034	52.5	2223	01:03	172.1
1 May	20387	0044	73.8	5877A	0039	53.8	2235	01:07	174.8
2 May	20400X	0138	87.4	5891X	0045	55.1	2247	01:12	177.6
3 May	20412	0037	72.2	5905A	0050	56.4	2259	01:17	180.3
4 May	20425	0132	85.8	5919A	0055	57.7	2271	01:21	183.0
5 May	20437	0031	70.6	5933J	0100	59.0	2283	01:26	185.7
6 May	20450	0125	84.2	5947J	0105	60.3	2295	01:31	188.5
7 May	20462qrp	0025	69.1	5961A	0110	61.7	2307	01:35	191.2
8 May	20475	0119	82.7	5975A	0116	63.0	2319	01:40	193.9
9 May	20487X	0018	67.5	5989X	0121	64.3	2331	01:45	196.6
10 May	20500	0113	81.1	6003A	0126	65.6	2343	01:49	199.3
11 May	20512	0012	66.0	6017A	0131	66.9	2355	01:54	202.0
12 May	20525	0106	79.6	6031J	0136	68.2	2367	01:59	204.8
13 May	20537	0006	64.4	6045J	0142	69.5	2378	00:03	177.3
14 May	20550qrp	0100	78.0	6058A	0004	45.0	2390	00:08	180.0
15 May	20563	0154	91.6	6072A	0009	46.3	2402	00:12	182.7
16 May	20575X	0053	76.4	6086X	0014	47.6	2414	00:17	185.4
17 May	20588	0148	90.0	6100A	0019	49.0	2426	00:22	188.2
18 May	20600	0047	74.9	6114A	0024	50.3	2438	00:26	190.9
19 May	20613	0141	88.5	6128J	0029	51.6	2450	00:31	193.6
20 May	20625	0041	73.3	6142J	0035	52.9	2462	00:36	196.3
21 May	20638qrp	0135	86.9	6156A	0040	54.2	2474	00:40	199.1
22 May	20650	0034	71.8	6170A	0045	55.5	2486	00:45	201.8
23 May	20663X	0129	85.4	6184X	0050	56.8	2498	00:50	204.5
24 May	20675	0028	70.2	6198A	0055	58.1	2510	00:55	207.2
25 May	20688	0122	83.8	6212A	0101	59.4	2522	00:59	209.9
26 May	20700	0022	68.6	6226J	0106	60.8	2534	01:04	212.7
27 May	20713	0116	82.2	6240J	0111	62.1	2546	01:09	215.4
28 May	20725qrp	0015	67.1	6254A	0116	63.4	2558	01:13	218.1
29 May	20738	0109	80.7	6268A	0121	64.7	2570	01:18	220.8
30 May	20750X	0009	65.5	6282X	0126	66.0	2582	01:23	223.6
31 May	20763	0103	79.1	6296A	0132	67.3	2594	01:27	226.3
1 June	20775	0002	64.0	6310A	0137	68.6	2606	01:32	229.0
2 June	20788	0057	77.6	6324J	0142	69.9	2618	01:37	231.7
3 June	20801	0151	91.1	6337J	0004	45.4	2630	01:41	234.4
4 June	20813qrp	0050	76.0	6351A	0009	46.7	2642	01:46	237.2
5 June	20826	0145	89.6	6365A	0014	48.1	2654	01:51	239.9
6 June	20838X	0044	74.4	6379X	0019	49.4	2666	01:55	242.6
7 June	20851	0138	88.0	6393A	0025	50.7	2678	02:00	245.3

REFERENCE ORBITS (CON'T)

	OSCAR 7			OSCAR 8			RS-1		
DATE	Ref Orbit	Time (UTC)	Long °W	Ref Orbit	Time (UTC)	Long °W	Ref Orbit	Time (GMT)	Long °W
8 June	20863	0038	72.9	6407A	0030	52.0	2689	00:04	217.8
9 June	20876	0132	86.5	6421J	0035	53.3	2701	00:09	220.5
10 June	20888	0031	71.3	6435J	0040	54.6	2713	00:14	223.3
11 June	20901qrp	0125	84.9	6449A	0045	55.9	2725	00:18	226.0
12 June	20913	0025	69.8	6463A	0051	57.2	2737	00:23	228.7
13 June	20926X	0119	83.3	6477X	0056	58.5	2749	00:28	231.4
14 June	20938	0018	68.2	6491A	0101	59.8	2761	00:32	234.1
15 June	20951	0113	81.8	6505A	0106	61.2	2773	00:07	236.9
16 June	20963	0012	66.6	6519J	0111	62.5	2785	00:42	239.6
17 June	20976	0106	80.2	6533J	0116	63.8	2797	00:46	242.3
18 June	20988qrp	0006	65.1	6547A	0122	65.1	2809	00:51	245.0
19 June	21001	0100	78.7	6561A	0127	66.4	2821	00:56	247.8
20 June	21014X	0154	92.3	6575X	0132	67.7	2833	01:00	250.5
21 June	21026	0054	77.1	6589A	0137	69.0	2845	01:05	253.2
22 June	21039	0148	90.7	6603A	0142	70.3	2857	01:10	255.9
23 June	21051	0047	75.6	6616J	0004	45.8	2869	01:14	258.6
24 June	21064fd	0141	89.1	6630J	0009	47.1	2881	01:19	261.4
25 June	21076qrp	0041	74.0	6644A	0015	48.4	2893	01:24	264.1
26 June	21089	0135	87.6	6658A	0020	49.8	2905	01:28	266.8
27 June	21101X	0034	72.4	6672X	0025	51.1	2917	01:33	269.5
28 June	21114	0129	86.0	6686A	0030	52.4	2929	01:38	272.3
29 June	21126	0028	70.9	6700A	0035	53.7	2941	01:42	275.0
30 June	21139	0122	84.5	6714J	0040	55.0	2953	01:47	277.7
1 July	21151	0022	69.3	6728J	0046	56.3	2965	01:52	280.4

(Continued from Page 14)

If you so desire, you can add yet another strip, same markings, for RS2 but this time marking the top edge in a different colour. This can be pre-set up for time, merely requiring a change to its eqx crossing °W by a slight map rotation.

Circles within the access range circle may be added marked in ° elevation if you so desire, giving the ° that the satellite is above the horizon as it bisects this line.

No doubt you will have many more ideas for additions, but beware over complication, as the great advantage of this system is to simplify your operation, and yet to give you a better idea exactly where the spacecraft is, and when, and to help you sense unity with its passage in a very real sense.

I would like to acknowledge G2AOX, who put forth the original idea of using a stereographic polar map to make plotting easier, and W2GFF who came out with the idea of first using a pivoted real time plotter to make things even simpler.

(Continued from Page 18)

MARISE EAST and K3KWJ for assistance in translations from the original Russian.
K1HTV and WA2LQQ for copies of their work on the high-speed telemetry system.
DL3SX and OK3CDI, SWL Berger Lindstrom, and may others for information observed.

REFERENCES:

(1) "Into the Cosmos - Radio-Amateur Satellites" and "In Orbit- RS", Soviet Patriot articles following launch.

(2) Information by UA3CR via RS3A on "Radio" nets, 0800 Saturdays, 14.270 MHz.

(3) Observations by Berger Lindstrom, OH-SWL and DL3SX in letters to G3IOR.

(4) "RADIO" No. 1, 1979, sent by SMØDZL.

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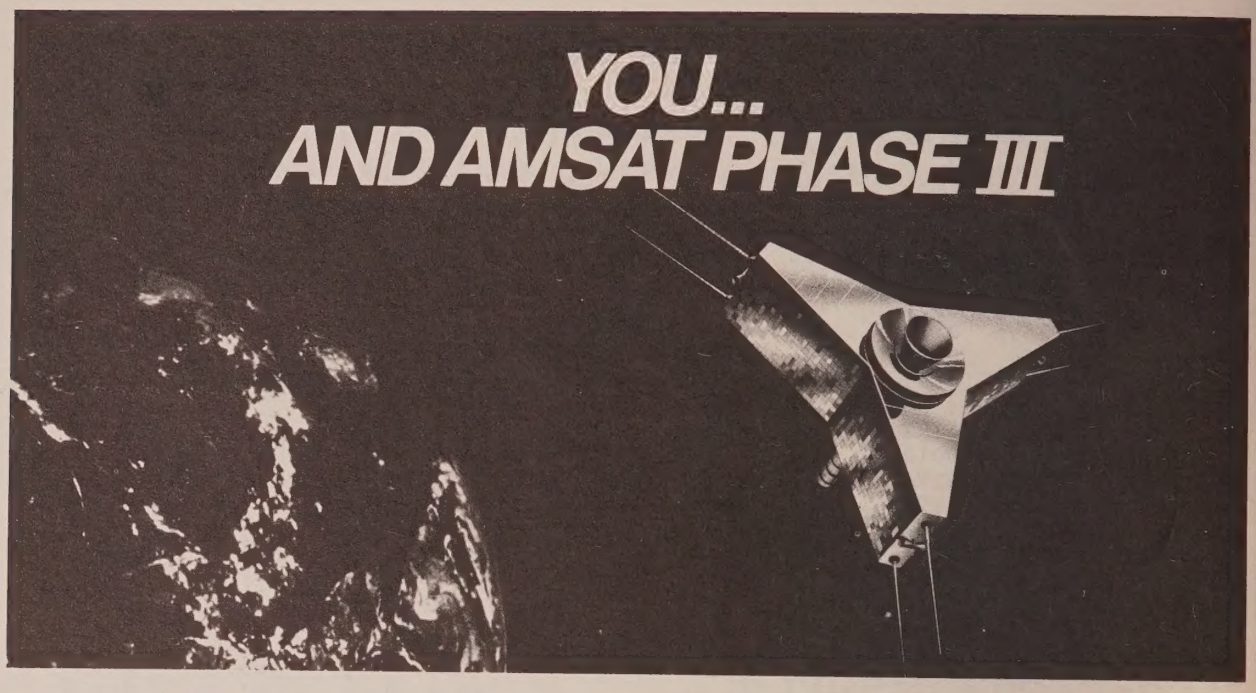

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